SUBSOIL INVESTIGATION

FOR BORROW MATERIAL,

STAGE 1 TAILINGS DAM

FOR ESCALANTE SILVER MINE

IRON COUNTY, COLORADO

Prepared For
Ranchers Exploration and Development Corporation

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#### GENERAL

This report presents the results of two subsoil investigations conducted at the proposed tailing disposal site which will serve Ranchers Exploration and Development Corporation's Escalante Silver Mine. The area of investigation is located in portions of Sections 2, 3 and 10 of Township 36 South, Range 17 West, Salt Lake P.M., Iron County, Utah.

The purpose of this investigation is to provide subsoil information pertinent to the Stage 1 Tailings Dam borrow material; including the delineation of soil, bedrock or ground water conditions which may affect the excavation, processing, placement and suitability of the borrow material for embankment and liner use.

The information presented is based upon data gathered during recent field investigations utilizing test pits in March, 1981, and on prior field investigations utilizing test borings in February and March, 1981. The prior site investigation was performed for a previous report: Geotechnical Investigation for the proposed Mill and Tailings Disposal Areas, Escalante Project, Iron County, Utah, our Job No. 1-2762-3106, dated May 14, 1980. Factual data gathered during the March, 1981 field investigation with related laboratory results are presented on Figures 2 through 19. Pertinent factual data gathered during the February and March, 1980 investigation is presented in Appendix A with related laboratory results presented in Appendix B.

#### FIELD INVESTIGATION

Refer to Figure 1 for the locations of test pits and test holes (borings). Test pits 1 through 15 were located in the Stage 1 reservoir of the disposal area, borings T2-1 through T2-5 in the general reservoir area, test pits 16 through 19 and borings EP2-1 through EP2-3 northeast of the

reservoir area, and test pits 20 through 27 and borings T3-1 through T3-4 were located south of the reservoir area.

Location and elevation data on several borings were provided by the client. The other boring locations and elevations as well as test pit locations are estimated by us and are indicated on Figure 1.

Test pits 1 through 15, located in the reservoir area were excavated with a Leibherr 965 trackhoe. Test pits 16 through 27, located outside of the reservoir area, were excavated with a Case 580C backhoe. Disturbed bulk bag samples were collected from the pit walls where possible, or from the excavating bucket, in approximate 1.5 to 10 pound representative quantities.

The borings were drilled with either a 6 inch diameter hollow stem continuous flight auger, a 4 inch diameter solid stem continuous flight auger, or a 2 15/16 inch diameter rotary bit. The soils were sampled at selective intervals with either a standard split-spoon sampler or a 2 inch Modified California Barrel Sampler. Standard penetration tests were conducted with both samplers.

All samples were field classified and packaged for shipment to our Denver Laboratory.

Test pit logs are presented on Figures 2 and 3. Boring logs, standard penetration test results, field permeability test results, and core recovery and condition data are presented in Appendix A.

#### LABORATORY TESTING

The undisturbed and disturbed soil and NX core samples from the field investigation were carefully opened, cataloged, and classified by project level personnel. Inspection of samples followed the procedures outlined in ASTM D-2488, Standard Recommended Practice Description of

Soils (Visual-Manual Procedures). Samples were divided into groups possessing similar engineering characteristics. Representative samples of each group were then chosen for subsequent laboratory testing. The laboratory testing program for this report consisted of classification tests and compaction tests. Classification and compaction tests include unit weight and moisture content determinations, Atterberg Limits, gradations, and Standard (ASTM D-698) and Modified (ASTM D-1557) Proctor compaction analysis. All laboratory tests have been conducted in accordance with appropriate ASTM test procedures. Laboratory test data for the test pit samples are presented on Figures 4 through 19, and in Appendix B for the boring samples.

The gradation tests shown on Figures 4 through 16 represent testing on representative in-situ samples and also some retesting of processed samples after crushing with approximately 100 blows of a 5.5 pound hammer or grinding of the material. Figures 17 through 19 represent three composite sample grouping tests from similar previously tested material. The composite gradation is shown for previously tested material in the group and other gradation tests are shown after crushing of gravel size material and grinding of sand and finer size material.

The test results presented on Figures D-1 through D-9 and D-13 of Appendix B represent a composite sample from the surface to a total depth of 4 feet from each of the borings tested.

#### SUBSOIL CONDITIONS

Refer to the Logs of Test Pits, presented on Figures 2 and 3, and the Logs of Borings presented in Appendix A. For the purposes of comparing these two sets of data, it should be understood that information derived from the test pits can be necessarily more precise than from

borings due to a larger area being investigated and the closer visual examination possible in the test pit.

Generally, the subsoils encountered in the test pits and borings consist of an upper stratum of very sandy clay to clayey sand overlying silty sand and/or silty to clayey sand and gravel strata. A portion of the silty sand and the silty to clayey sand and gravel strata is cemented with calcium carbonate.

The upper very sandy clay to clayey sand with gravel strata (CL-SC w/GC) was encountered in all the test pits and most of the borings to depths of 0.3 to 4.5 feet. Approximately the top six inches of this material is typically organic topsoil with roots near plant growth and with some roots systems below six inches. A "pea" gravel covers most of this surface strata. Larger gravels are also present in this material, but typically occur less so with depth.

This material grades into either a strata of silty sand with occasional gravel (SM w/GP) or into a strata of silty to clayey sand and gravel with some cobbles and boulders and some well graded sand lenses (SM-GM-SC-GC-SW). One to four feet of the silty sand with gravel (SW w/GP) was encountered in seven of the 27 test pits, and 2.5 to 15.5 feet of this material was encountered in the borings. The silty to clayey sand and gravel strata with some cobbles and boulders was encountered elsewhere in the test pits and borings. Some deep small size roots were present in these materials.

The test pit excavations revealed a prevalent but erratic depth of cementation of the silty to clayey sand and gravel with calcium carbonate in 19 of the 27 test pits. This cementation, a conglomerate, is represented by vertical lines on the logs, and ranged from 1 to 4.3 feet in thick-

ness or to below the total depth of the pit. The calcium carbonate cementing agent is typically combined with silty sand. Both excavating machines used for the test pits encountered very hard to refusal conditions in this material.

#### DISCUSSION

The very sandy clay to clayey sand with gravel material below the typical upper six inches of organic topsoil, generally meets the liner specifications. However, some tests of this material showed an insufficient percentage passing the #200 sieve. In this case, it may be possible to remove some gravel pieces from the material in order to meet the liner requirements.

The silty sand with gravel (SM w/GP) and the silty to clayey sand and gravel material (SM-GM-SC-GC w/SW) as well as the cemented (conglomerate) material is suitable for the embankment. The cobbles, boulders and cemented materials larger than six inches in size (one half the loose layer thickness) will have to be removed or broken down in size in order to be utilized for the embankment.

The quantity of very sandy clay to clayey sand with gravel (CL-SC w/GC) encountered in the Stage 1 reservoir area may not be sufficient for the amount needed as backfill in trenchs below the embankment and to line the reservoir bottom and the embankment face.

One alternative to obtain additional quantities of suitable liner material would be to process the materials below the naturally suitable liner materials. Some of the silty sand with gravel, the silty to clayey sand and gravel, and cemented (conglomerate) material could be

processed to remove cobbles, boulders and large gravel size material in order to obtain the required percentage of material passing the #200 sieve (clay or silt material). The crushing and grinding done in the laboratory testing indicates that this type of processing does not substantially increase the clay or silt size particle content.

Another alternative to obtain additional quantities of liner material would be to borrow from outside the reservoir area. Specifically, additional borrow material for the liner could be obtained in the tested areas of test pits 16 through 19 northeast of the reservoir, or in the area of test pits 20 through 27 south of the reservoir.

Both alternatives for obtaining additional liner material should be considered, i.e., process and remove large size material within the reservoir area or borrow outside of the reservoir area. Obtaining borrow outside of the reservoir area may not be acceptable to the owner due to reclamation and revegetation requirements after construction. This firm, in conjunction with the owner, will make the final decision concerning additional liner borrow sources outside of the reservoir area.

The calcium carbonate cemented (conglomerate) sand and gravel is very hard. It is believed that blasting will not be required, but ripping will be required to break the material enough for excavation and use as embankment material

F. M. FOX & ASSOCIATES

ARTHUR J.

GREENGARD, JR.

David W. Potter

Staff Geotechnical Engine

DWP/rd

Copies: 12

Reviewed by:

Arthur J. Greengard,

Denver Area Manage

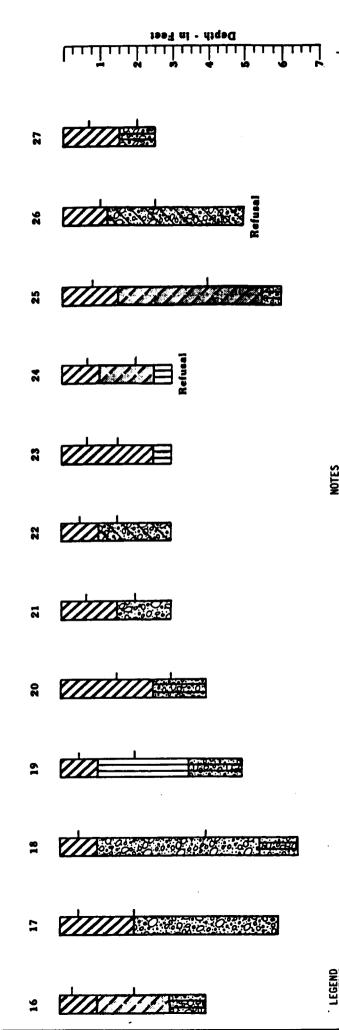
notes. Refer to Figure 3 for legend and LOGS OF TEST PITS

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FOX

Date: 3/23/81 | Figure



## NOTES

Test Pits 1 through 15 excavated or March 17, 1981 with a Liebherr 965 Trackhoe. **-**:

CLAY, very sandy to SAND, clayey (top 6 inches with roots beneath plants, some deeper roots) GRAVEL at surface, less GRAVEL with depth, medium stiff to stiff moist, brown to dark brown (CL-SC with GP) GC)

CONGLOMERATE, SAND and GRAVEL, cemented with calcium carbonate, silty, some clayey, very hard to extremely hard, slightly moist, light

brown to white with gray (SM-GM-SC-GC)

- Test Pits 16 through 27 were excavated on March 26, 1981 with a Case 5800 Backhoe. 2
- sample taken from test pit or bucket. Indicates location of disturbed bulk
- Indicates range of soil contact encountered in test pit. Contact depths shown are general boundaries.
- Refusal Indicates refusal conditions with back-hoe during excavation.
- the test pits at the time of excavation. No water or bedrock was encountered in

# LOGS OF TEST PITS

FOX

GRAVEL

SAND, silty, some clayey, occasional GRAVELS, medium dense to dense, slightly moist, some calcareous, white to light brown (SM with GP)

SAND and GRAVEL, clayey, some cobbles and boulders, dense to very dense, medium moist to moist, light brown to brown (SC-GC)

SAND and GRAVEL, some cobbles and boulders, some well graded SAND lenses, silty, some clayey, fewroots, dense to very dense, slightly moist to moist, light brown to brown (SM-GM-SC-GC-SM)

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CONGLOMERATE, SAND and GRAVEL, some cobbles and boulders, cemented with calcium carbonate, silty, some clayey, very hard to extremely hard, slightly moist, light brown to white with gray (SM-GM-SC-GC)

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SIEVE ANALYSIS Sand Gravel Cobbles coarse fine coarse medium fine Clear Square Openings U.S. Standard Series #8 #16 #30 #50 #100 #200 3" 1 1/2" 3/4" 3/8" #4 Sample of CLAY, sandy 90 from test pit \_\_\_\_\_] 80 at depth \_\_\_\_\_ feet. 70 Atterberg limits: 60 Liquid Limits \_\_\_\_ 50 Plasticity Index 40 Classification: Unified Cl 30 AASHTO \_\_\_\_ 20 Group Index \_ 10 CONGLOMERATE, SAND and 100 Sample of GRAVEL, silty 90 from test pit 4 80 at depth \_\_\_\_ 70 Atterberg Limits: 60 Natural Liquid Limits \_\_\_\_\_ 50 Plasticity Index \_\_\_\_ Classification: Unified \_\_SM-GM\_ 30 AASHTO \_\_\_\_\_ Group Index \_\_\_\_ 10 CONGLOMERATE, GRAVEL 100 Sample of sandy, slightly organic 90 from test pit \_\_2 80 at depth \_\_\_\_\_ feet. 70 Atterberg Limits: 60 Liquid Limits \_\_\_38 Plasticity Index 2 Classification: Unified \_\_\_\_GD 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_\_ Grain Size in Millimeters MECHANICAL ANALYSIS CHART Job No: 1-2762-3106-09 4/10/81 Date: Consulting Engineers and Geologists

Figure

SIEVE ANALYSIS Gravel Sand Cobbles coarse fine coarse medium fine Clear Square Openings! U.S. Standard Series 5" 3" 1 1/2" 3/4" 3/8" #4 **◆8 ◆16 ◆30 ◆50 ◆100 ◆20**0 GRAVEL, slightly clayey Sample of with cobbles 90 from test plt \_\_\_\_2 80 at depth \_\_\_\_\_ 70 PERCENT PASSING Atterberg limits: Liquid Limits \_\_\_\_\_ Plasticity Index \_\_\_\_\_ Classification: Unified GP-GC 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 100 Sample of SAND and GRAVEL, clayey 90 from test pit \_ 80 at depth \_\_\_\_\_ feet. 70 PERCENT PASSING Atterberg Limits: 60 Liquid Limits \_\_\_\_ Plasticity Index \_\_\_\_ --40 Classification: Unified SC-GC 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 100 Sample of GRAVEL, sandy, clavey from test pit \_\_\_\_4 at depth \_\_\_\_\_ feet. 70 PERCENT PASSING Atterberg Limits: 60 Liquid Limits 40 Plasticity Index 21 40 Classification: Unified 30 AASHTO \_\_\_\_ 20 Group Index \_\_\_\_ 200 127 76.2 38.1 19.1 9.52 4.76 2.38 1.19 .590 .297 .149 .074 Grain Size in Millimeters Job No: 1-2762-3106-09 MECHANICAL ANALYSIS CHART Date: 4/10/81 FOX Consulting Engineers and Geologists

Figure

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SIEVE ANALYSIS Sand coarse medium fine Gravel Cobbles coarse fine U.S. Standard Series Clear Square Openings 1008-5-3-1 1/2-3/4-3/8-04 CONGLOMERATE, GRAVEL, #8 #16 #30 #50 #100 #200 sandy, slightly clayey 90 from test pit \_\_ 80 at depth \_\_\_\_\_ feet. 70 PERCENT PASSING Atterberg limits: 60 Liquid Limits 41 50 Plasticity Index \_\_\_\_22 40 Classification: Unified GP-GC 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 SAND and GRAVEL, silty, 100 Sample of slightly organic 90 from test pit \_\_\_\_5 80 at depth \_\_\_\_\_4 feet. 70 Atterberg Limits: 60 Liquid Limits 41 50 Plasticity Index \_\_\_\_4 40 Classification: Unified <u>SM-GM</u> 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_\_ Sample of GRAVEL, clayey 90 from test pit \_\_6\_\_ at depth 0.5 feet. PERCENT PASSING 70 Atterberg Limits: 60 Liquid Limits \_\_\_\_42 Plasticity Index \_\_\_\_21 Classification: Unified \_ GC 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ Grain Size in Millimeters MECHANICAL ANALYSIS CHART Job No: 1-2762-3106-09 4/10/81 Date: FOX Consulting Engineers and Geologists **Figure** 

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SIEVE ANALYSIS Sand Cobbles coarse fine coarse medium Clear Square Openings U.S. Standard Series -8 -16 -30 -50 -100 -200 3" 1 1/2" 3/4" 3/8" #4 GRAVEL, sandy, well graded Sample of Silty 90 from test pit \_\_\_\_6 80 at depth \_\_\_\_\_\_ 2.5 \_\_\_\_\_ feet. 70 PERCENT PASSING Atterberg limits: 60 Liquid Limits \_\_\_\_ 50 Plasticity Index \_\_\_\_\_ 40 Classification: Unified \_\_GW-GM 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 0 100 Sample of CLAY, sandy 80 at depth \_\_\_\_\_\_ feet. 70 PERCENT PASSING Atterberg Limits: 60 Liquid Limits \_\_\_\_\_24 50 Plasticity Index \_\_\_\_\_16 40 Classification: Unified \_\_CL 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_ 10 GRAVEL, sandy, well graded 100 Sample of slightly silty 90 from test plt \_\_\_\_\_\_7 80 at depth \_\_\_\_ 70 PERCENT PASSING Atterberg Limits: 60 Liquid Limits \_\_\_\_\_ Plasticity Index \_\_\_\_\_ 40 Classification: Unified GW-GM AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ Grain Size in Millimeters MECHANICAL ANALYSIS CHART Job No: 1-2762-3106-09 4/10/81 Date: FOX Consulting Engineers and Geologists

**Figure** 

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SIEVE ANALYSIS Sand Gravel coarse medium U.S. Standard Series Clear Square Openings 1/2" 3/4" 3/8" #4 Sample of GRAVEL, sandy, clayey 90 from test plt \_\_\_\_\_8 80 70 Atterberg limits: 60 Liquid Limits \_\_\_\_\_27 50 40 Classification: Unified \_\_GC 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 0 100 Sample of SAND and GRAVEL, silty 90 from test pit \_\_\_\_ 80 at depth \_\_\_\_\_\_ 3\_ feet. 70 Atterberg Limits: 60 Liquid Limits \_\_\_\_\_ 50 Plasticity Index \_\_\_\_\_ 40 Classification: Unified SM-GM 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_\_ 10 0 SAND and GRAVEL, well graded, slightly silty 100 90 from test pit . 80 at depth \_\_\_\_6 70 PERCENT PASSING Atterberg Limits: 60 Liquid Limits \_\_\_\_\_ 50 Plasticity Index \_\_\_\_ 40 Classification: Unified \_\_\_\_\_GW-SW 30 AASHTO \_\_\_\_ 20 Group Index \_\_\_\_ 10 Grain Size in Millimeters Job No: 1-2762-3106-09 MECHANICAL ANALYSIS CHART 4/10/81 Date: **Consulting Engineers and Geologists** 

**Figure** 

SIEVE ANALYSIS Sand coarse medium fine Gravel Cobbles coarse fine U.S. Standard Series Clear Square Openings 3" 1 1/2" 3/4" 3/8" #4 #8 #16 #30 #50 #100 #200 Sample of SAND and GRAVEL, clayey from test pit \_\_\_\_9 80 at depth \_\_\_\_\_ feet. 70 PERCENT PASSING Atterberg limits: Liquid Limits \_\_\_\_\_25 50 Plasticity Index \_\_\_\_ 40 Classification: Unified \_\_SC-GC 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 100 GRAVEL, sandy, slightly Sample of Silty 90 from test pit \_\_\_\_\_9 80 at depth \_\_\_\_ 70 Atterberg Limits: 60 Liquid Limits \_\_\_\_\_ 50 Plasticity Index \_\_\_\_ Classification: Unified \_\_\_GP-GM AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 CONGLOMERATE GRAVEL 100 Sample of \_\_\_\_\_Silty 90 from test pit \_\_\_\_\_10 80 at depth 3 feet. 70 Atterberg Limits: 60 Liquid Limits \_\_\_\_\_ 50 Plasticity Index \_\_\_\_\_ 40 Classification: Unified GM 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ Grain Size in Millimeters MECHANICAL ANALYSIS CHART Job No: 1-2762-3106-09 4/10/81 Date: FOX Consulting Engineers and Geologists

**Figure** 

SIEVE ANALYSIS Gravel Sand Cobbles coarse fine
Clear Square Openings coarse medium fine U.S. Standard Series 3" 1 1/2" 3/4" 3/8" +4 #8 #16 #30 #50 #100 #200 Sample of GRAVEL, sandy, clayey 90 80 at depth \_\_\_\_\_5\_\_feet. 70 PERCENT PASSING Atterberg limits: Liquid Limits \_\_\_\_\_32 Plasticity Index \_\_\_\_\_16 Classification: Unified \_\_GC AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 O 100 Sample of SAND, gravelly, clayey 90 from test pit \_\_\_\_\_13 80 at depth \_\_\_\_\_\_ feet. 70 PERCENT PASSING Atterberg Limits: 60 Liquid Limits \_\_\_\_\_29 50 Plasticity Index \_\_\_\_\_13\_\_ 40 Classification: Unified \_ SC 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 100 Sample of \_\_\_GRAVEL, sandy, clayey from test pit 14 80 at depth \_\_\_\_\_\_ feet. 70 Atterberg Limits: 60 Liquid Limits 30 50 Plasticity Index 11 40 Classification: Unified GC 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_ 10 Grain Size in Millimeters MECHANICAL ANALYSIS CHART Job No: 1-2762-3106-09 4/10/81 Date: FOX Consulting Engineers and Geologists

**Figure** 

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SIEVE ANALYSIS Sand Gravel coarse medium coarse fine U.S. Standard Series Clear Square Openings 1/2" 3/4" 3/8" +4 CONGLOMERATE, GRAVEL. Sample of sandy 90 from test pit \_\_\_\_\_14 80 3 feet. 70 PERCENT PASSING Atterberg limits: 60 Liquid Limits \_\_\_\_\_ 50 Plasticity Index \_\_\_\_ 40 Classification: Unified GP 30 AASHTO \_\_\_\_ 20 Group Index \_\_\_\_ 10 GRAVEL, sandy, slightly 100 Sample of silty 90 from test pit 15 80 at depth \_\_\_\_\_ 3 \_\_ feet. Atterberg Limits: PERCENT PASSING 60 Liquid Limits \_\_\_ 50 Plasticity Index \_\_\_\_\_\_ 40 Classification: Unified <u>GP-GM</u> 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 0 GRAVEL, sandy, well graded 100 Sample of slightly clayey 90 from test pit \_\_\_\_\_15 80 at depth 6.5 feet. 70 Atterberg Limits: 60 Liquid Limits \_\_ 50 Plasticity Index \_\_ Classification: Unified \_\_GW\_GC 30 AASHTO \_\_ 20 Group Index \_\_ 10 Grain Size in Millimeters MECHANICAL ANALYSIS CHART Job No: 1-2762-3106-09 4/10/81 Date: Consulting Engineers and Geologists FOX

**Figure** 

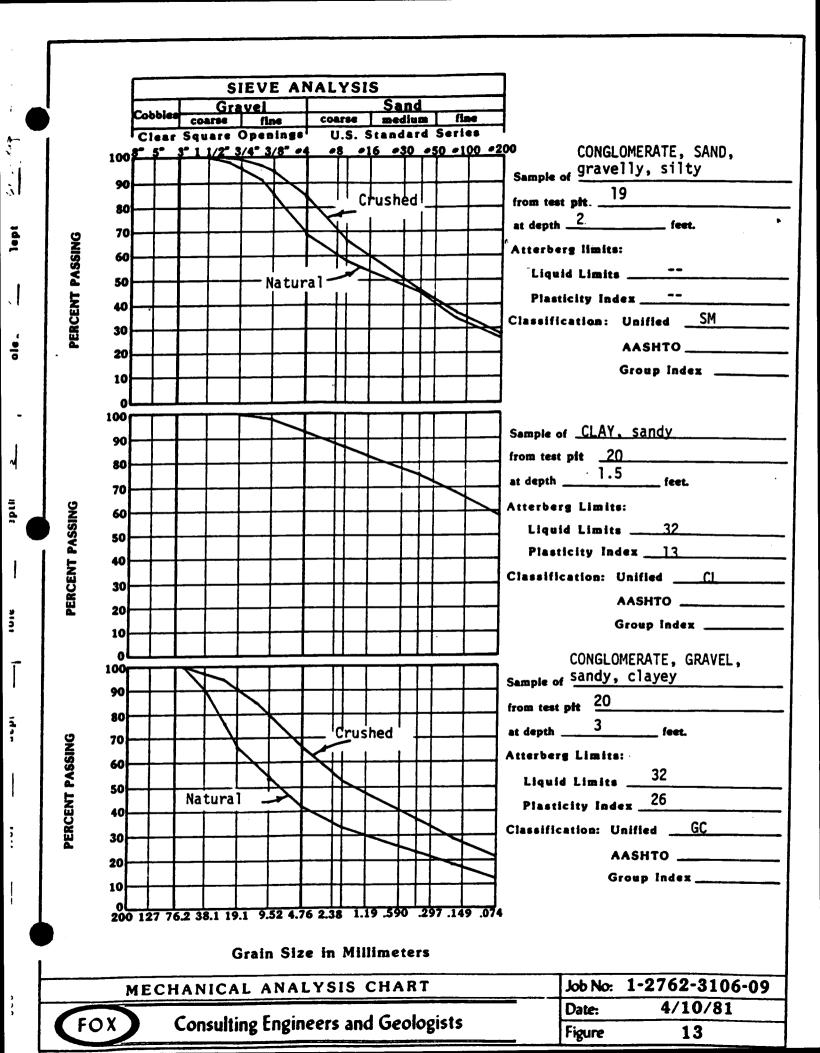
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SIEVE ANALYSIS Sand Gravel coarse medium fine Clear Square Openings U.S. Standard Series 3" 1 1/2" 3/4" 3/8" •4 •8 •16 •30 •50 •100 •200 Sample of \_\_\_\_\_\_SAND and GRAVEL, clayey 90 from test plt 16 80 at depth 0.3 feet. PERCENT PASSING Atterberg limits: Liquid Limits \_\_\_\_27 Plasticity Index 12 Classification: Unified \_\_\_SC-GC AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 100 SAND and GRAVEL, silty from test pit \_\_\_\_17 at depth 2 feet. Atterberg Limits: Liquid Limits \_\_\_\_\_-Plasticity Index \_\_\_\_\_\_ 40 Classification: Unified SM-GM 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 100 Sample of CLAY, sandy, gravelly 90 from test plt \_\_\_\_18 at depth 0.5 feet. 70 PERCENT PASSING Atterberg Limits: 60 Liquid Limits \_\_\_\_\_37 50 Plasticity Index \_\_\_\_\_\_19 Classification: Unified \_\_\_\_ 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 Grain Size in Millimeters MECHANICAL ANALYSIS CHART Job No: 1-2762-3106-09 4/10/81 Date: **Consulting Engineers and Geologists** FOX

Figure

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SIEVE ANALYSIS Sand Cobbles coarse fine coarse medium Clear Square Openings U.S. Standard Series SAND and GRAVEL, clayey Sample of to CLAY 90 from test plt 22 80 at depth 0.5 70 PERCENT PASSING Atterberg limits: 60 Liquid Limits \_\_\_\_\_ 50 Plasticity Index \_\_\_\_\_ 40 Classification: Unified \_\_\_SC-GC-CL 30 AASHTO \_\_\_\_ 20 Group Index \_\_\_\_ 10 100 Sample of SAND and GRAVEL, clayey from test pit \_\_\_\_ 80 at depth 0.6 feet. 70 PERCENT PASSING Atterberg Limits: 60 Liquid Limits \_\_\_ 50 Plasticity Index \_\_\_-40 Classification: Unified \_\_\_\_SC-GC 30 AASHTO \_\_ 20 Group Index \_\_\_\_ 10 0 100 Sample of SAND and GRAVEL, clayey 90 from test pit \_\_\_\_\_ 80 at depth 0.6 feet. 70 PERCENT PASSING Atterberg Limits: 60 Liquid Limits \_\_\_ Plasticity Index \_ 40 SC-GC Classification: Unified \_\_\_\_ 30 AASHTO \_ 20 Group Index \_\_\_ 10 Grain Size in Millimeters Job No: 1-2762-3106-09 MECHANICAL ANALYSIS CHART 4/10/81 Date: FOX Consulting Engineers and Geologists 14 **Figure** 

SIEVE ANALYSIS Cobbles Coarse fine Sand coarse medium Clear Square Openings U.S. Standard Series 1008 5 3 1 1/2 3/4 3/8 -4 #8 Sample of GRAVEL and SAND, silty 90 from test pit \_\_\_\_\_ 80 at depth \_\_\_\_\_ feet. 70 PERCENT PASSING Atterberg limits: 60 Liquid Limits \_\_\_\_\_ 50 Plasticity Index \_\_\_\_\_ 40 Classification: Unified \_ GM-SM 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 100 Sample of CLAY, sandy, gravelly from test pit \_\_\_\_26 80 at depth \_\_\_\_\_ feet. 70 Atterberg Limits: 60 Liquid Limits \_\_\_\_\_ 50 Plasticity Index \_\_\_\_ 40 Classification: Unified CL 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_ 10 0 SAND and GRAVEL, clayey 100 Sample of with cobbles 90 from test pit \_\_\_\_\_27 80 at depth 0.6 feet. 70 PERCENT PASSING Atterberg Limits: Liquid Limits \_\_\_\_\_-Plasticity Index \_\_\_\_\_\_ 40 Classification: Unified SC-GC 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_ 10 200 127 76.2 38.1 19.1 9.52 4.76 2.38 1.19 .590 .297 .149 .074 Grain Size in Millimeters Job No: 1-2762-3106-09 MECHANICAL ANALYSIS CHART Date: 4/10/81

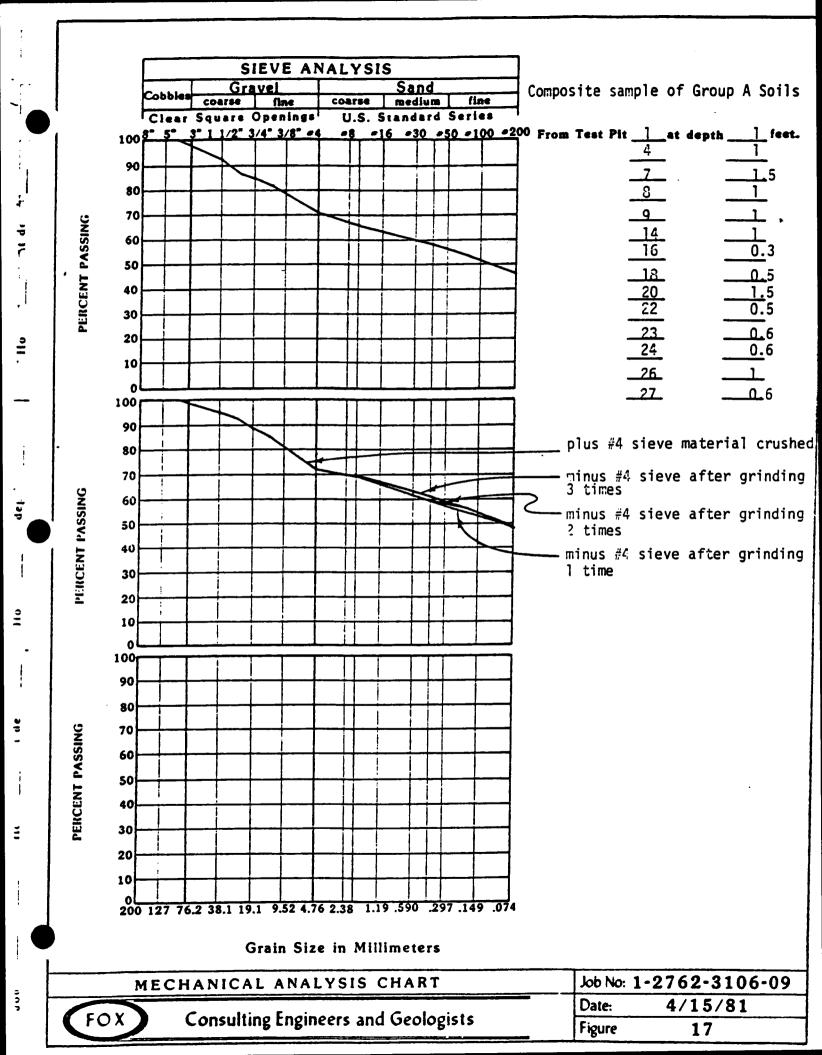
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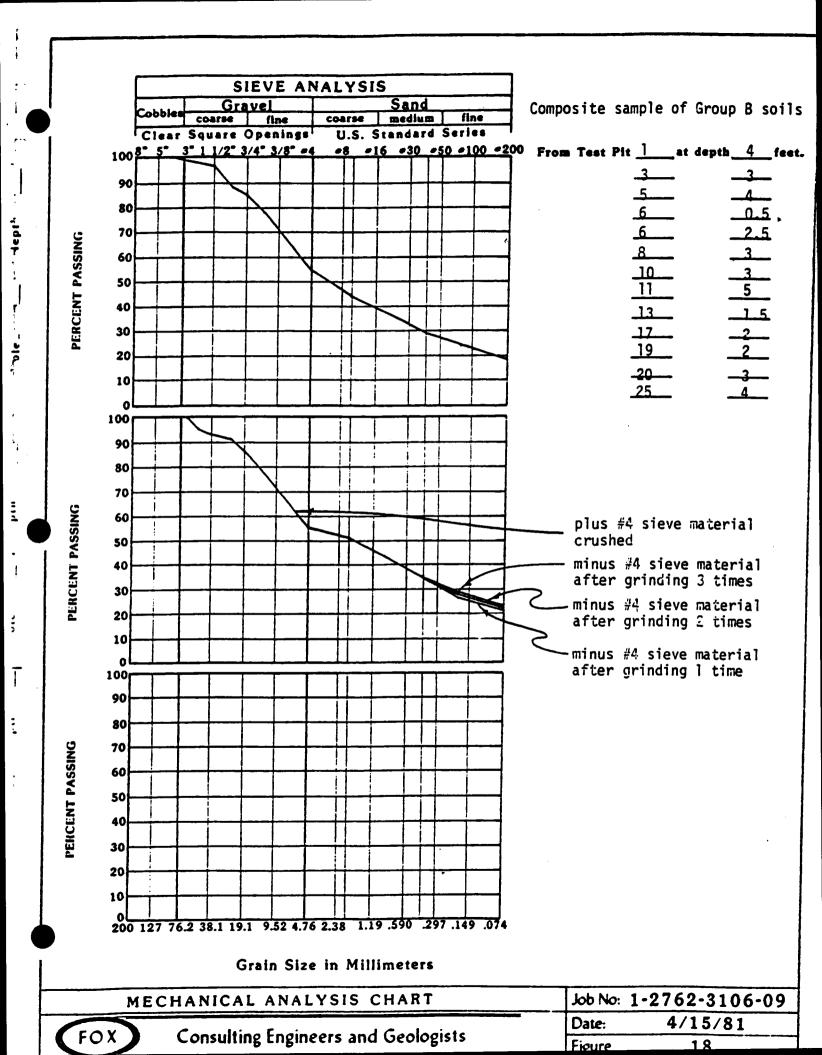
Figure

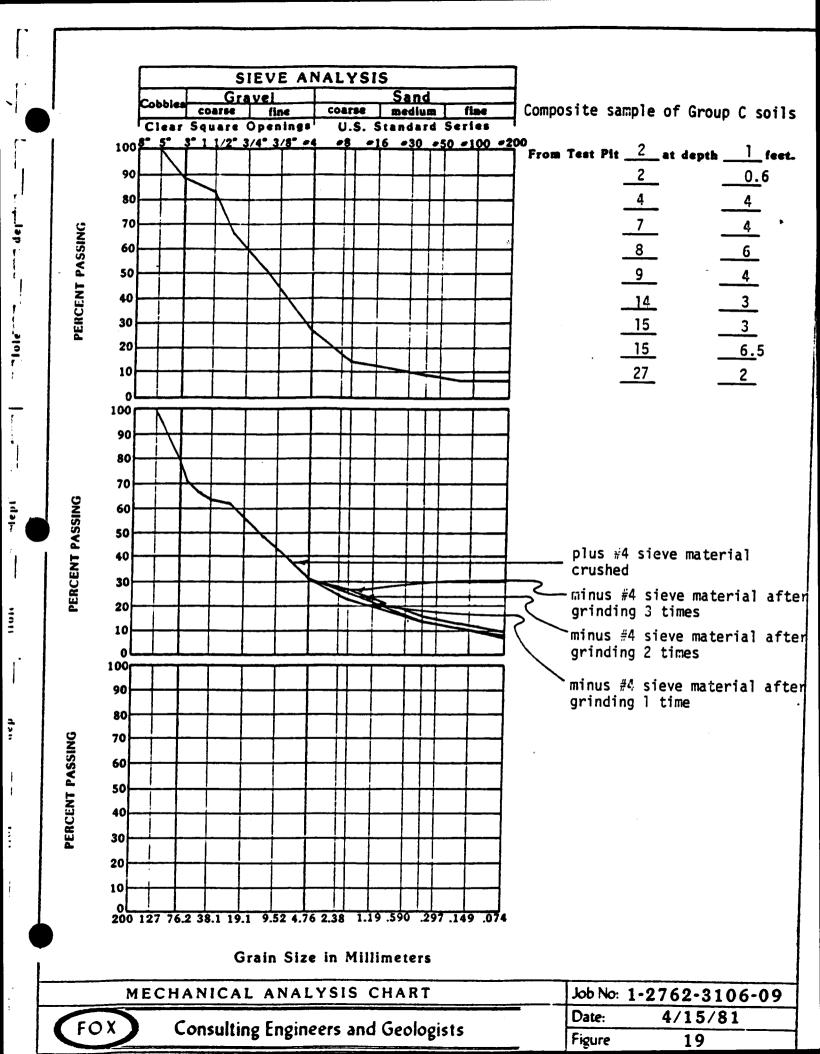
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SIEVE ANALYSIS Sand Gravei coarse medium U.S. Standard Series Clear Square Openings 1 1/2" 3/4" 3/8" #4 CONGLOMERATE, SAND and Sample of GRAVEL, slightly silty 90 from test pit \_\_\_\_\_27\_\_\_ 80 at depth 2. feet 70 PERCENT PASSING Atterberg limits: 60 Liquid Limits \_\_\_\_\_ Crushed 50 Plasticity Index \_\_\_\_ Natural Classification: Unified \_\_\_\_SP-SM-GP-GM 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 100 Sample of \_\_\_\_\_ 90 from test hole \_\_\_\_ 80 at depth \_\_\_\_\_ feet. 70 Atterberg Limits: 60 Liquid Limits \_\_\_\_\_ 50 Plasticity Index \_\_\_ 40 Classification: Unified \_\_ 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_\_ 10 100 Sample of \_\_\_\_\_ 90 from test hole \_\_\_\_ 80 70 Atterberg Limits: 60 Liquid Limits \_\_\_\_\_ 50 Plasticity Index \_\_\_ 40 Classification: Unified 30 AASHTO \_\_ 20 Group Index \_\_\_ 10 Grain Size in Millimeters MECHANICAL ANALYSIS CHART Job No: 1-2762-3106-09 Date: 4/10/81 FOX Consulting Engineers and Geologists **Figure** 16







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ä	100	Soil Description	Natural Moleture	Netural Dry	Atterberg Limits	Limite	Unconf.	Soluble	Perme- ability	Specific	Refer	
ŝ	Sample (ft.)		Content (X)	Density (pcf)	1	ā		Sulfates	164-16	Gravity	Figure No.	Remarks
_	_	CLAY, sandy (CL)	16.8		31	=					4	
-	4A	CONGLOMERATE, SAND and GRAVEL, silty (SM-GM)	!		<u>-</u>	1					4	Natural sample
_	48	CONGLOMERATE, SAND and GRAVEL, silty (SM-GM)	:		. ;	i	<del></del> .		<del>-</del>		4	
~	AL	CONGLOMERATE, GRAVEL, sandy, slightly organic (GP)	ļ	-	38	8					4	o Comes Leville
~	18	CONGLOMERATE, GRAVEL, sandy, slightly organic (GP)	i		88	8					. 4	
2	œ	GRAVEL, slightly clayey with cobbles (GP-GC)	i		1	!		•			, (c	
ო	т	SAND and GRAVEL, clayey (SC-GC)	!		:	!					ى ر	
4	~	GRAVEL, sandy, clayey (GC)	1		40	12				r	ם נ	
4	4	CONGLOMERATE, GRAVEL, sandy, slightly clayey (GP-GC)	i		14	22					) <u>u</u>	
S	4	SAND and GRAVEL, silty, slightly organic (SM-GM)	!		4	4					<b>.</b>	
9	0.5	GRAVEL, clayey (GC)			42	21					o (	
9	2.5	GRAVEL, sandy, well graded, silty (GW-GM)	<del></del>		i I	İ					<b>o</b>	
		SUMMARY OF LABORATORY	TORY	TESTING	٦ 			-				
								5/	Job No:	79/2-1		6
		FOX Consulting Engineers and G	Neers a	nd Geol	rologists			١	Date:	April	F6, 1981	
								11	I able:	l PAGE	iE J	

[

1

Test Pit	Dept.	Soli Describatos	Natural	Natural	Atterber	Atterbarg Limits	Unconf.	Soluble	Perme-	Specific	Refer	
°	Sample (ft.)		Content (X)	Denetry (pcf)	11	ī	Strength (paf)	Sulfates	9.04	Gravity	to Figure	React
	1.5	CLAY, sandy (CL)	:		24	16					7	
_	4	GRAVEL, sandy, well graded slightly silty (GW-GM)	!		. !							
80	_	GRAVEL, sandy, clayey (GC)	i		27	7				_		
ω	<b>м</b>	SAND and GRAVEL, silty (SM-GM)	!	•	!	!					∞	
ω	9	GRAVEL and SAND, well graded, slightly silty (GW-SW)	!		1	!						
თ	,	SAND and GRAVEL, clayey (SC-GC)	!		25	6					) 6	
6	4	GRAVEL, sandy, slightly silty (GP-GM)	!		1	!				-	, o	
9	ო	CONGLOMERATE, GRAVEL, silty (GM)	ŧ		!							
Ξ	S	GRAVEL, sandy, clayey (GC)	;		32	16					, c	
13	1.5	SAND, gravelly, clayey (SC)	14.5		53	13					2 5	
14	_	GRAVEL, sandy, clayey (GC)	1		30	=					2 2	
14	м	CONGLOMERATE, GRAVEL, sandy (GP)	!		į	i i					2 =	
		SIMM SERVICE										
		SUMMART OF LABORATORY TEST	TORY	TESTING				7	Job No:	1-276	1-2762-3106-09	
		FOX Consulting Engineers and Geologists	Kers a	nd Geol	ogists	i		۱	Date:	April	April 16, 1981	
									Table:	-	PAGE 2	

Gravity Figure No.  11 Crushed sample	Crushed			12	12	12	13 Natural sample	13 Crushed sample	13	3 Natural sample	13 Crushed sample		7	<b>V</b> (	1-2762-3106-09	April-16, 1981	
Sulfates Gra					-										Job No:		Telle
Strength	(bet)												<del></del>				
	11 P1	-	42   19	21 72	;	37   19	· ·	!	32 13	32 26	32 26	:	:	37 19		aict.	<b>X1213</b>
	Deneity (pcf)														TESTING	Special pro-	
Moleture	Content (X)	-	!	:	;	ł	;	!	:	1	!	!	!	;	ATORY		
		GRAVEL, sandy, slightly silty (GP-GM)	<pre>GRAVEL, sandy, well graded slightly clayey (GW-GC)</pre>	SAND and GRAVEL, clayey (SC-GC)	SAND and GRAVEL, silty (SM-GM)	CLAY, sandy, gravelly (CL)	CONGLOMERATE, SAND, gravelly, silty (SM)	CONGLOMERATE, SAND, gravelly, silty (SM)	· CLAY, sandy (CL)	CONGLOMERATE, GRAVEL, sandy, clayey (GC)	CONGLOMERATE, GRAVEL, sandy, clayey (GC)	SAND and GRAVEL, clayey to CLAY (SC-GC-CL)	SAND and GRAVEL, clayey (SC-GC)	SAND and GRAVEL, clayey (SC-GC)	SUMMARY OF LABORATORY TESTING	FOX Consulting Engineers and Goodeniese	
5	Semple (ft.)	က	6.5	0.3	2	0.5	2A	28	1.5	34	g 	0.5	9.0	0.6			
ž	Š	15	15	16	11	18	19	19	20	50	20	55	23	24			

Date: Table:

Consulting Engineers and Geologists

PAGE 3

Teet Pit	Depth		Natural	Natural	Atterberg Limits	1 Limits	Unconf.	Soluble	Perme-	Specific	Refer to	
No.	Sample (ft.)		Content (X)	Density (pcf)	11	I.		Sulfates (X)	16 cmbec	Gravity	Figure No.	
52	4	GRAVEL and SAND, silty (GM-SM)	;		:	-				-	15	
97	_	CLAY, sandy, gravelly (CL)	i		;	:					15	
27	9.0	SAND and GRAVEL, clayey, with cobbles (SC-GC)	;		;	!			-		15	
27	2A	CONGLOMERATE, SAND and GRAVEL, slightly silty (SP-SM-GP-GM)	1		1	1					91	Natural sample
27	28	CONGLOMERATE, SAND and GRAVEL, slightly silty (SP-SM-GP-GM)	ŀ	•	1	ł					16	Crushed sample
Vari	Various	*Group A	!		1	!					17	
Vari	Various	*Group B	!		1	! 			مارين الراسيد br>الراسيد الراسيد الراسي		18	
Vari	Various	· *Group C	<u> </u>		ŀ	!					19	
		*See Figures for Description	n Descri		of Soil	Samples	in Eac	Group		-		
								No. of State				
											<b></b>	
		SUMMARY OF LABORATORY TEST	ATORY	TESTING	ပြ				Job No:		1-2762-3106-09	60-
النجيين	•	(FOX) Consulting Engineers and Geologists	meers a	and Geo	logists			<u> 1</u>	Date:	Apri		1981
									Table:		PAGE 4	

APPENDIX A
PREVIOUS FIELD INVESTIGATION

SHEET 1 OF 1

	JEC1	':R	anche	<u> </u>	Escalante Project	PROJECT	NO	:	1-2	767.	1106			_	801	RING	NO:	2-1
					5,364	TOTAL D	EPTI	H: _	1	50	feet			_				
					0 DATE FINISHED: 3/1	4/80	LO	GG	ED I	BY:	Kip b	ihi te		-	REV	IEWE	D 8Y:	Don Taylor
TYPE AND SIZE OF HOLE	Z		GRAPHIC LOG	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION	PENETRATION RESISTANCE	R Q D (X)	CORE RECOVERY	(%)	TEST SECTIONS	FIELD PERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	R PASSING 200	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	DRY DENSITY (PCF)		NOTES .
	5364 5359 5354	5	2		TOPSOIL  SAND, clayey to silty, with gravel dry to medium moist, very dense, ribrown with gray lenses (SC-SM with GM)								5		32			
	\$344 \$344	20-																
R	5354 5329	30																
	5324 5319 5314	49 45 45 50																

#### HOLE TYPES

A - INDICATES SOLID AUGER

AA - INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

INDICATES CORE RECOVERY

INDICATES CORE LOSS INDICATES WATER RECORDED

#### STANDARD PENETRATION TEST

71/12 RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES. REQUIRED TO DRIVE A STANDARD SAMPLER 12 INCHES.

> + USED 2 INCH DIAMETER CALIFORNIA SAMPLER

SHEET\_2\_OF\_1

720	JEC:	T:	lanche	ers -	Escalante Project	PROJE	CT	NO:	1.	2762	-31	06			_	BOR	IING .	NO:	12-1	
	ı					TOTAL	DE	PTH	: <u> </u>	150	fe	et			_					
DAT	E BE	GUN	: 2/28	3/80	DATE FINISHED: 3/14	/80	_	LOG	GE	D 8	Y:_	K1p	White	<u> </u>		REV		D 8Y:_	Don Taylor	
TYPE AND SIZE OF HOLE	ELEVATION (FEET)	DEPTH (FEET)	GRAPHIC LOG	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION	PENETRATION	RESISTANCE	8 Q D (X)	CORE RECOVERY	(%)	TEST SECTIONS	PERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	A PASSING 200	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	DRY DENSITY (PCF)		NOTES	•
R	5314 5309	50																		
-	5304	60												ľ						
	5299	65			SAND, clayey to silty, with gravel															
	<b>1294</b>	70-11			SAND, clayey to silty, with gravel lenses, dry to medium moist, very den red brown with gray lenses (SC-SM wit GC-GM)	nse, i		•												
	5289	75																		
	5264	<b>\$0</b>																	• .	
	5279	***************************************																		
	5274	90																		
*******	5269																	,		
	5264	100																		

#### OLE TYPES

- · INDICATES SOLID AUGER
- INDICATES HOLLOW AUGER
- C INDICATES CORE HOLE
- R INDICATES ROTARY HOLE

#### EXPLANATION

INDICATES CORE RECOVERY



INDICATES CORE LOSS RECORDED

#### STANDARD PENETRATION TEST

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES, REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

> • USED 2 INCH DIAMETER CALIFORNIA SAMPLER

SHEET\_1\_OF\_1\_

_ 、	JEC1	۲.	Ranci	hers	- Escalante Project	PROJECT	NO:	_1	-2762	2-31	106			-	BOR	LING	NO: <u>T2-1</u>
						TOTAL D								-			
50K	FACI	. ELI	.VAT	/28/R								hite		_	REV	IEWE	D BY: Don Taylor
	ELEVATION (FEET)		90	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION	PENETRATION RESISTANCE	T	CORE RECOVERY		TEST SECTIONS	FIELD PERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	* PASSING 200	PLASTIC LIMIT (%)	LIQUID LIMIT (\$)	DRY DENSITY (PCF)	NOTES
R		100-					-	Ħ		H							
	5259																
	5254	110															
	5249	115															
	5244	120			SAND, clayey to silty, with gravel lenses, dry to medium moist, very der red brown with gray lenses (SC-SM wit GC-GM)	nse, th											
	5239	125															
-	5234	130			·												
	5229																
	6224																
	5219	145															

SA - INDICATES SOLID AUGER

.1A - INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

#### EXPLANATION

INDICATES CORE RECOVERY



INDICATES CORE LOSS

### INDICATES WATER RECORDED

### STANDARD PENETRATION TEST

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES. REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

> . USED 2 INCH DIAMETER CALIFORNIA SAMPLER

SHEET\_1\_OF4\_

			0 e b		Escalante Project	PRO	JECT	NO:		1-270	62 -	3106			_	BOR	ING !	10:	T2-2	
							AL DE				-				_					
					5,346  DATE FINISHED:							K1p	White		-			D 8Y:_	Don Tayl	or
TYPE AND SIZE OF HOLE	ELEVATION (FEET)	DEPTH (FEET)	GRAPHIC LOG	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITIO	N	PENETRATION RESISTANCE	R Q D (K)	CORE RECOVERY	(X)	TEST SECTIONS	FIELD PERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	R PASSING 200	PLASTIC LIMIT (X	LIQUID LIMIT (X)	DRY DENSITY (PCF)		NOTES	•
HA	5346				TOPSOIL  CLAY, sandy to SAND, clayey, gi silty, slightly moist to moist stiff to stiff, dark brown to a (CL-SC)	red prown					-			44 33 28	13 15	26 26	115			
R -	5336	10			SAND, silty, gravelly and claye slightly moist to medium moist, very dense, light brown to red (SM-SC)	ey in part, dense to brown	50/12							23	16	26	102			
	5331	15			SAND, clayey to silty, with gralenses, dry to medium moist, we red brown with gray lenses (SC-GC-GM)	erv dense.	50/6													
	1326	20					50/3					-			•					
-		25-					63/6													
_	<b>3316</b>	30																		
	<b></b>	35-																		
	5306	40																		
	5301 5296	45-																		
							XPLA	NAT	ION											

#### HOLE TYPES

SA - INDICATES SOLID AUGER

HA - INDICATES HOLLOW AUGER

C . INDICATES CORE HOLE

R . INDICATES ROTARY HOLE

INDICATES CORE RECOVERY

INDICATES WATER RECORDED

INDICATES CORE LOSS

#### STANDARD PENETRATION TEST

50/12 RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES, REQUIRED TO DRIVE A STANDARD SAMPLER 12 INCHES.

> . USED 2 INCH DIAMETER CALIFORNIA SAMPLER

SHEET 2 OF 4

		<b>.</b>	Ranci	ners -	Escalante Project	PRO	JECT	NO:	1-	2762	-31	06			-	BOR	ING	NO:1	2-2	_
					5,346		AL DE				-				_					
													White		_	REV	IEWE	D BY:	Don Taylor	
			1:3/	/5/80	DATE FINISHED:	3/14/80		LUG	-											_
TYPE AND SIZE OF HOLE	ELEVATION (FEET)	DEPTH (FEET)	GRAPHIC LOG	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION		PENETRATION RESISTANCE	R Q D (%)	CORE RECOVERY	(X)	TEST SECTIONS	FIELD PERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	R PASSING 200	PLASTIC LIMIT (X	LIQUID LIMIT (X)	DRY DENSITY (PCF)		NOTES	
R	5296	50																		
	5291	58-																		
-	5224	60-																		
	5281	65-		-	SANO, clayey to silty, with grave lenses, dry to medium moist, ver red brown with gray lenses (SC-Si	el y dense,										•				
	5276	70-			red brown with gray lenses (SC-Si GC-GM)	H with														
	5271	75-																		
-	5264	80-																		,
-	5261	85-																		
	5256	90-																		
	5251	95-															į			
	5246	100					XPLA	NATI			_				1		[			لـ

#### HOLE TYPES

SA - INDICATES SOLID AUGER 1A - INDICATES HOLLOW AUGER

C · INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

INDICATES CORE RECOVERY

INDICATES WATER RECORDED

INDICATES CORE LOSS

#### STANDARD PENETRATION TEST

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES, REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

> . USED 2 INCH DIAMETER CALIFORNIA SAMPLER

SHEET 3 OF 4

	150	<b>.</b>	0.0	here -	- Escalante Project PRO	DJECT	NO:	_	1-27	62-	106			_	BOR	ING P	NO:
					1.3(2) 21132 1222	TAL DE				-				_			
				710 N: 3/5/80								hite		-	REV		D BY:Oon Taylor
TYPE AND SIZE OF HOLE		T	90	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION	PENETRATION RESISTANCE	R Q D (K)	CORE RECOVERY	(8)	TEST SECTIONS	FIELD PERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	R PASSING 200	PLASTIC LIMIT (%)	רולחום רואוג (צ)	DRY DENSITY (PCF)	NOTES .
НА	5244	100					0		10				-		,		100' Started Coring
	5241	105-					10		35								
-	5234	110															
-	523	115					10		20						-		
R.	:23	1 20			SAND, clayey to silty, with gravel lenses, dry to medium moist, very dense red brown with gray lenses (SC-SN with GC-GM)	•			i								
-	522	1 125															
-	321	- 130															
-	521	1 135															
	520 520	4 2 4 0															
	5 520 5 520	145													:		
	511	4 150				EXPL	L NA			Ш			·· <u>·</u>				

# HOLE TYPES

SA - INDICATES SOLID AUGER

HA - INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

INDICATES CORE RECOVERY

RECORDED

INDICATES CORE LOSS

# INDICATES WATER

# STANDARD PENETRATION TEST

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES. REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

SHEET\_4\_OF\_4

	-0	JEC	T:	Ra	ncher	s - Escalante	Project	PRO	JECT	NO:		1-2	762	-3106		 _	ВС	RING	NO:	15-5
	ا،.	FAC	E EL	EVAT	TION:	: 5,346		TO1	AL D	EPTH	t: _	200	م ف	eet		 _				
1	DAT	E 8 (	EGUN	l:	3/5/	во	DATE FINISHED:	1/14/80		LOC	GGI	ED 8	Y:	Ki	o Whit	 _	RE	VIEW	ED BY:	Don Taylor
•	TYPE AND SIZE OF HOLE			GR	WATER LEVEL	РНУ	LITHOLOGY AND SICAL CONDITION		PENETRATION	R Q D (X)	CORE RECOVERY	ŝ.	TEST SECTIONS	FIELD PERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	DRY DENSITY (PCF)		NOTES ,
		\$191 \$186 \$171 \$176 \$171 \$166	185			SAND, clayey lenses, dry red brown wi GC-GM)	to silty, with grave to medium moist, very th gray lenses (SC-S!		(PLAN			15								

# HOLE TYPES

SA - INDICATES SOLID AUGER

IA - INDICATES HOLLOW AUGER

C . INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

INDICATES CORE RECOVERY

INDICATES WATER RECORDED

INDICATES CORE LOSS

### STANDARD PENETRATION TEST

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES. REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

# F.M. FOX & ASSOCIATES, INC.

SUBSURFACE EXPLORATION LOG SHEET 1 OF 3 T2-3 BORING NO: \_\_\_ PROJECT: Ranchers - Escalante Project PROJECT NO: \_\_\_1-2762-3106\_ FACE ELEVATION: \_\_\_\_ 5,359 TOTAL DEPTH: 150 feet REVIEWED BY: Don Taylor LOGGED BY: \_\_Dave\_Douglass DATE FINISHED: 3/15/80 DATE BEGUN: 3/15/80 LAB PERMIABILITY CM./SEC. FIELD PERMIABILITY CM./SEC. Ş PENETRATION RESISTANCE AND SIZE F HOLE CORE RECOVERY SECTION CMI ELEVATION (FEET) LIMIT 8 LITHOLOGY PASSING DENSITY DEPTH (FEET) GRAPHIC ۵ NOTES × AND LASTIC WATER 0 dino TYPE A TEST Œ PHYSICAL CONDITION DRY HA- 5359 TOPSOIL SAND, silty, gravelly and clayey in part, slightly maist to medium moist, dense to very dense, light brown to red brown (SM-2-107 46 32 33 86/6 5354 5 SAND, clayey to silty, with gravel lenses, dry to medium moist, very dense, red brown with gray lenses (SC-SM with GC-GM) N.R. 5349 10-5344 15 25/5 21107 46 32 33 T52/12 20→;... 5339 182/6 5334 25-30-5129 5324 35-40-7 5319

## HOLE TYPES

5314 45

SA - INDICATES SOLID AUGER A . INDICATES HOLLOW AUGER

C . INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

INDICATES CORE RECOVERY



EXPLANATION

INDICATES WATER LEVEL AND DATE RECORDED

INDICATES CORE LOSS

# STANDARD PENETRATION TEST

86/6 RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES, REQUIRED TO DRIVE A STANDARD SAMPLER 6 INCHES.

SHEET 2 OF 3

		Ranch	ers -	Escalante Project	PRO	JECT	NO:	1	-276	2-3106			_	BOR	IING	NO:	<u> 12-3</u>
										eet							
- JRFACI	E ELI	EVAT	ION:	5,359									_	201	iewe	n sv.	Don Taylor
DATE BE	GUN	: <u>_1/</u> 1	15/80	DATE FINISHED:	3/15/80		LOG						_			J BY:_	DON TRYTOT
TYPE AND SIZE OF HOLE ELEVATION (FEET)		E C	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION		PENETRATION RESISTANCE	R Q D (X)	CORE RECOVERY	(X)	FIELD FERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	R PASSING 200	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	DRY DENSITY (PCF)		NOTES
HA- 5309	50																
S299	60-			SAND, clayey to silty, with gravel lenses, dry to medium moist, very dred brown with gray lenses (SC-SI w GC-GM)	dense, with												
- 5284																	
5274	, , , , , , , , ,																
5244	95					XPLAI											

# HOLE TYPES

SA - INDICATES SOLID AUGER

HA - INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

INDICATES CORE RECOVERY

INDICATES CORE LOSS INDICATES WATER RECORDED

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES, REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

SHEET\_1 OF\_1

<b>~</b> ~0	JEC1	<b>r</b> .	Ranci	mers -	Escalante Project	PRO	JECT	NO:		1-27	62-3106			_	BOF	IING	NO: <u>T2-3</u>
			_				AL DE							_			
					5,359							ouglas:		_	REV	IEWE	D BY: Don Taylor
DAT				3/15/	80 DATE FINISHED: 3/15	,, 00		100						_			
TYPE AND SIZE OF HOLE	ELEVATION (FEET)	DEPTH (FEET)	GRAPHIC LOG	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION		PENETRATION RESISTANCE	R Q D (%)	CORE RECOVERY	(X)	FIELD FIELD PERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	* PASSING 200	PLASTIC LIMIT (%)	LIQUID LIMIT (X)	DRY DENSITY (PCF)	NOTES ,
HA	5259	100	: :::														
	5254	105			·												
	5249	110															
	5244	115-			cann claves to cilty with grave)	lenses											·
	5239	120			SAND, clayey to silty, with gravel dry to medium moist, very dense, re brown with gray lenses (SC-SM with GM)	d GC-		20									120 Started Coring
	5234	125-						20				•					•
R	5229	130															
	5224																
	5214	145-			·										:		
		150					XPLA										

### HOLE TYPES

SA - INDICATES SOLID AUGER

HA - INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

INDICATES CORE RECOVERY INDICATES WATER RECORDED

INDICATES CORE LOSS

# STANDARD PENETRATION TEST

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES, REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

eursel on 1				
	SHEET	1	OF_	2

200	JEC:	<b>T</b> :	Ranc	hers	- Escalante Project PRO	JECT	NO:	1	-276	2-3106			_	805	RING	NO: <u>TZ-4</u>
						AL DI	EPTH	l:	160	feet			_			
•					80 DATE FINISHED: 3/16/80						ite			REV		D BY: Don Taylor
TYPE AND SIZE OF HOLE	ELEVATION (FEET)	DEPTH (FEET)	GRAPHIC LOG	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION	PENETRATION RESISTANCE	R Q D (X)	CORE RECOVERY	TEST SECTIONS	FIELD PERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	R PASSING 200	PLASTIC LIMIT (%)	LIQUID LIMIT (\$)	DRY DENSITY (PCF)	NOTES
C	1	********			TOPSOIL  CLAY, sandy to SAND, gravelly, silty, slightly moist to moist, medium stiff to stiff, dark brown to red brown (CL-SC)  SAND, silty, gravelly and clayey in part, slightly moist to medium moist, dense to very dense, light brown to red brown (SM-SC)  SAND, clayey to silty, with gravel lenses, dry to medium moist, very dense, red brown with gray lenses (SC-SH with GC-GM)							18	19	36 22		0-11.5' used pitcher sampler
		15														Drilling
	5386	20														
	5351	*******														
	\$346 \$341	30														
Treatment of the state of the s	1336	4														
	5331	45 11 11 11 11														
لنا	1326	<u>50</u> ₹							لل			!				

# HOLE TYPES

A - INDICATES SOLID AUGER

A - INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

## EXPLANATION

INDICATES CORE RECOVERY



RECORDED

INDICATES CORE LOSS INDICATES WATER
LEVEL AND DATE

# STANDARD PENETRATION TEST

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES, REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

SHEET 2 OF 2

	OJE	CT	·	Ken	Cilera	- Escalante Project	PRO	DJECT	NO:		<u>-2762</u>	-3106			_	801	RING	NO:	T2-4	
Ų	.FA	CE	EL	EVA	TION	1:5.376	101	AL DI	EPTH	l:	160	feet	_							
DA	TE E	BE	GUN	l:1.	/16/8	O DATE FINISHED:	3/16/80		LOC	GE	D 81	r:	ip Whit	e	-	REV	IEWE	D BY:_	Don Taylor	
TYPE AND SIZE	+	$\perp$	DEPTH (FEET)	GR.	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION		PENETRATION RESISTANCE	R Q D (X)	CORE RECOVERY	(%)	FIELD FERMIABILITY	LAB PERMIABILITY CM./SEC		PLASTIC LIMIT (%)	LIQUID LIMIT (%)	DRY DENSITY (PCF)		NOTES	•
R	531	26 2 7 7 8	55 60 55 70 5 5 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		8	SAND, clayey to silty, with gravel dry to medium moist, very dense, re brown with gray lenses (SC-SM with GC-GM)	lenses.			03					714	917	<b>8</b> d			
1	52 <b>8</b> 1																			

# HOLE TYPES

A - INDICATES SOLID AUGER

. - INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

# EXPLANATION

INDICATES CORE RECOVERY



INDICATES WATER RECORDED

INDICATES CORE LOSS

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES. REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

STANDARD PENETRATION TEST

SHEET 1\_\_ OF \_\_L

280	JECT	٠,	Ranch	ers -	Escalante Project	PRO.	JECT	NO:		1-2762	-3106			-	BOR	ING !	10:	18-3
					5,415	TOTA	AL DE	PTH	·	156 fe	et			_				
DATI						3/4/80		LOG	GE	. BY:	Kip i	ihite		_	REV	IEWE	D BY:	Don Taylor
TYPE AND SIZE		DEPTH (FEET)	90	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION		PENETRATION RESISTANCE	RQD(X)	OVERY	(X) TEST SECTIONS		LAB PERMIABILITY CM./SEC.	X PASSING 200	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	DRY DENSITY (PCF)		NOTES
HA		25-		^	TOPSOIL CLAY, sandy to SAND, clayey, g silty, slightly moist to moist stiff to stiff, dark brown to brown (CL-SC) SAND, slity, gravelly and clay part, slightly moist to medium dense to very dense, light browned brown (SM-SC)  SAND, clayey to silty, with gr lenses, dry to medium moist, v red brown with gray lenses (SC GC-GM)	medium red  ey in moist, who to  avel ery dense, -SM with	75/12 51/6 50/6					1410	42	17	36	112		
	5378 5376				•													
	5361	50					XPLA	NAT	ION					e <b>+</b> .	NCA	20.95	NETRAT	ION TEST

# HOLE TYPES

SA - INDICATES SOLID AUGER

HA - INDICATES HOLLOW AUGER

C · INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

INDICATES CORE RECOVERY

INDICATES CORE LOSS



INDICATES WATER RECORDED

75/12 RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES. REQUIRED TO DRIVE A STANDARD SAMPLER 12 INCHES.

SHEET \_2 OF\_\_4

	JEC1	. Rai	ncher	s - E	scalante Project	PRO	JECT	NO:	1-2	762-	3106			_	BOR	ing i	NO: <u>T2-5</u>
					5.415						feet			_			
					DATE FINISHED:	3/4/80		LOG	GED	BY	: <u>K1p</u>	White		_	REV	IEWE	D BY: Don Taylor
22	ELEVATION (FEET)	DEPTH (FEET)	90	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION		PENETRATION RESISTANCE		OVERY	(X) TEST SECTIONS	IELD IABILITY I./SEC.		* PASSING 200	PLASTIC LIMIT (X)	LIQUID LIMIT (%)	DRY DENSITY PCF	NOTES
R	5365	50 -										-					
	5360	55-1															
	5355	69															
	5350	65-			SAND, clayey to silty, with gravel	lenses,											
	5345	70			dry to medium moist, very dense, ri brown with gray lenses (SC-SM with GC-GM)	ed											
	5340	75									1.00						·
	1335	<b>30</b>															
	5330	85															
	\$325	90															
	5320	95		,													·
	5315	100					XPLA	NAT									

# HOLE TYPES

A - INDICATES SOLID AUGER

A - INDICATES HOLLOW AUGER

C . INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

INDICATES CORE RECOVERY



INDICATES CORE LOSS

# INDICATES WATER RECORDED

### STANDARD PENETRATION TEST

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES, REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

SHEET 3 OF 4

~	JEC	CT:		Ranch	ers -	Escalante Project	PRO	JECT	NO:	1-2	762-3	106			-	801	IING	NO: <u>T2-5</u>	
	FAC	ΞE	ELI	EVA'	TION	:	TOT	AL DE	PTH	i:	156 f	eet	_		_				
					3/2/8					GED			p White		-			D BY: Don Tayl	or
TYPE AND SIZE	ELEVATION	(FEET)	DEPTH (FEET)	GRAPHIC LOG	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION		PENETRATION RESISTANCE	R Q D (X)	CORE RECOVERY	(K) TEST SECTIONS	FIELD PERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	K PASSING 200	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	DRY DENSITY PCF	· NOTE	s ,
R	531 530 529		25-330-440-445-			SAND, clayey to silty, with grave dry to medium moist, very dense, brown with gray lenses (SC-SM with GC-GM)	red			8		1 = 1 0 6						140' Started Co	ring

# HOLE TYPES

SA - INDICATES SOLID AUGER

HA - INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

### EXPLANATION

INDICATES CORE RECOVERY

RECORDED

INDICATES CORE LOSS

# INDICATES WATER

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES. REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

STANDARD PENETRATION TEST

SHEET\_4 OF\_4

PRO	JEC	T:	Ranci	hers	- Escalante Project	PRO	JECT	NO:		-275	2-3106			_	801	RING	NO:	12-5	
					:	<b>TO</b> 1	AL DI	EPTH	l:	156	feet			_				•	
DA1	E B	EGUN	):	3/2/	80 DATE FINISHED:	3/4/80		LOC	GE	) B'	f: <u>Kip I</u>	ihite					D BY:_	Don Taylor	
TYPE AND SIZE	ELEVATION	DEPTH (FEET)	GRAPHIC LOG	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION		PENETRATION RESISTANCE	R Q D (K)	CORE RECOVERY	(X)	FIED FIELD CM./SEC.	PERMIABILITY CM./SEC.	& PASSING 200	PLASTIC LIMIT (%)	רוסחום רואוז (צ)	DRY DENSITY (PCF)		NOTES	Þ
C	5255	155			SAND, clayey to silty, with gravel dry to medium moist, very dense, re brown with gray lenses (SC-SM with GC-GM)	ed				20				-					

# HOLE TYPES

SA - INDICATES SOLID AUGER

1A - INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

### EXPLANATION

INDICATES CORE RECOVERY



INDICATES WATER RECORDED

INDICATES CORE LOSS

# STANDARD PENETRATION TEST

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES. REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

_	<b>40</b>	JEC.	T: _	Ranc	hers	- Escalante Project	PROJEC	T NO	:	1-27	762-3106			_	80	RING	NO: <u>FP2-1</u>	
						N:	TOTAL I	EPT	H:	19	feet							
C	ATI	E BE	GUI	N:	2/2	9/80 DATE FINISHED:	29/80	LO	GGED	8 Y	Kip_	<u>White</u>		_	RE	VIEW	ED BY: <u>Don Ta</u>	ylor
	TYPE AND SIZE OF HOLE	ELEVATION (FEET)	DEPTH (FFFT)	GRAPHIC LOG	WATER LEVEL		PENETRATION	R Q D (K)	CORE RECOVERY	TEST SECTIONS	FIELD PERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	K PASSING 200	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	DRY DENSITY PCF	NOT	ES ,
	HA	5312 5312 5302	10-		3	TOPSOIL  CLAY, sandy to SAND, clayey, gravell silty, slightly moist to moist, medi stiff to stiff, dark brown to red br (CL-SC)  SAND, silty, with gravel and clay, calcareous, dry to medium moist, densbuff (SM)  SAND, silty, gravelly and clayey in part, slightly moist to medium moist dense to very dense, light brown to red brown (SM-SC)  SAND, clayey to silty, with gravel ledry to medium moist, very dense, red brown with gray lenses (SC-SM with GC-GM)	75/1 se, 41/1	a 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			5=10 <sup>7</sup>		13	31	44			
	Leasesser		Leasestantes															

# HOLE TYPES

A - INDICATES SOLID AUGER

A - INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

## EXPLANATION

INDICATES CORE RECOVERY

INDICATES WATER
LEVEL AND DATE RECORDED

INDICATES CORE LOSS

# STANDARD PENETRATION TEST

75/12 RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES. REQUIRED TO DRIVE A STANDARD SAMPLER 12 INCHES.

PROJECT: Ranchers - Escalante Project								PROJECT NO: 1-2762-3106										BORING NO:EP2-2					
						5,322(est.)	TOTAL DEPTH: 19 feet																
DATE BEGUN: 2/29/80 DATE FINISHED:											D BY	-		REVIEWED BY: Don Taylor									
	TYPE AND SIZE OF HOLE	ELEVATION (FEET)	DEPTH (FEET)	GRAPHIC LOG	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITIO	N	PENETRATION RESISTANCE	R Q D (X)	CORE RECOVERY	(%)		LAB PERMIABILITY CM./SEC.	# PASSING 200	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	DRY DENSITY (PCF)		NOTES	•			
	HA	5312 5317 5317 5307	10-			TOPSOIL  CLAY, sandy to SAND, clayey, g silty, slightly moist to moist stiff to stiff, dark brown to brown (CL-SC)  SAND, silty, gravelly and claye slightly moist to medium moist, very dense, light brown to red (SM-SC)  SAND, clayey to silty, with gra lenses, dry to medium moist, ver red brown with gray lenses (SC- GC-GM)	, medium red  ey in part , dense to brown  evel ery dense,	75/13 78/12 30/12 50/6				8×10 <sup>6</sup>		25	15	30	85						

## HOLE TYPES

SA - INDICATES SOLID AUGER

A - INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

# EXPLANATION

INDICATES CORE RECOVERY

INDICATES CORE LOSS

INDICATES WATER RECORDED

75/12 RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES, REQUIRED TO DRIVE A STANDARD SAMPLER 12 INCHES.

STANDARD PENETRATION TEST

Renchers						ers - Escalante Project	PRO	JECT	NO:	1	-276	2-3106	BORING NO: EPZ-3						
						5,328(est.)		AL DE			9 fe	_							
D				: _2/.			2/29/80		LOG	GED	BY	K1p	White		-	REV	IEWE	D BY:	Don Taylor
TVPE AND CITE	OF HOLE	ELEVATION (FEET)	DEPTH (FEET)	GRAPHIC LOG	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION	N	PENETRATION RESISTANCE	R Q D (S)	CORE RECOVERY	TEST SECTIONS	FIELD PERMIABILITY CM./SEC.	PERMIABILITY CM./SEC.	X PASSING 200	PLASTIC LIMIT (X)	LIQUID LIMIT (%)	DRY DENSITY (PCF)		NOTES .
	ministration of the second	5328 5318 5313	20-			TOPSOIL  CLAY, sandy to SAND, clayey, gr silty, slightly moist to moist, stiff to stiff, dark brown to r (CL-SC)  SAND, silty, gravelly and clayer slightly moist to medium moist, very dense, light brown to red (SM-SC)  SAND, clayey to silty, with gralenses, dry to medium moist, vered brown with gray lenses (SC-GC-GM)	ed brown  y in part, dense to brown  vel	72/12 50/6				5-10 <sup>3</sup>			-				

# HOLE TYPES

- SA INDICATES SOLID AUGER
- HA INDICATES HOLLOW AUGER
- C INDICATES CORE HOLE
- R . INDICATES ROTARY HOLE

### EXPLANATION

INDICATES CORE RECOVERY

INDICATES CORE LOSS

# INDICATES WATER RECORDED

# STANDARD PENETRATION TEST

50/9 RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES. REQUIRED TO DRIVE A STANDARD SAMPLER 9 INCHES.

PROJECT:ESCALANTE								PROJECT NO: 1-2762-3106								BORING NO: T3-1					
						:	тот	AL D	EPTH	<b>1:</b> _		30				_					
							3/18/80 LOGGED BY:									_	RE	IEWE	D BY:_	LW	
	TYPE AND SIZE OF HOLE	ELEVATION (FEET)	DEPTH (FEET)	GRAPHIC LOG	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION		PENETRATION RESISTANCE	R Q D (X)	CORE RECOVERY	(X)	TEST SECTIONS	FIELD PERMIABILITY CN./SEC.	PERMIABILITY CM./SEC.	R PASSING 200	PLASTIC LIMIT (%)	LIQUID LIMIT (X)	DRY DENSITY (PCF)		NOTES	
	\$ <b>A</b>	54 <b>90</b> 5486 5480	5-	ζ		TOPSOIL  SAND, clayey to silty, with grave dry to medium moist, very dense, brown with gray lenses (SC-SM with GC-GM)	red h	\$7/6 BOUN													
		5475 5476	15			SAND, clayey, silty, occasional v cobble, very dense, dry, brownish red. (SC)	i	96/6 29/3					1=10 <sup>4</sup>								
	******************		25-					66/6 170/6													

# HOLE TYPES

SA - INDICATES SOLID AUGER

HA - INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

# EXPLANATION

INDICATES CORE RECOVERY



INDICATES WATER RECORDED

INDICATES CORE LOSS

# STANDARD PENETRATION TEST

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES. REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

	IEC1	<b>.</b>	ES	CALA	NTE	PROJECT NO: 1-2762-3106							_	BORING NO: T3-2						
						TOTAL DEPTH: 48'									_					
										ъ В'	Y:_	rn.			_	REV	IEWE	D BY:_	LW	
TYPE AND SIZE OF HOLE	(FEET)		ဗွ	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION		PENETRATION	R Q D (X)	OVERY		S	PERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	X PASSING 200	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	DRY DENSITY @CF)		NOTES	•
HA	33 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				TOPSOIL  CLAY, sandy, silty, occasional volc cobbles, very stiff, medium moist, ish red to red (SC)		60/9													
							71/6													
	5435	15-			SAND, clayey to silty, with gravel lenses, dry to medium moist, very do red brown with gray lenses (SC-SM wi GC-GM)		70/4						•							
	5430	20-			<b></b>		52/6				•	x 10 <sup>4</sup>								
- Interest	5425	25							-											
	1420	30			•		70/3													
	5415	35					_													ļ
1111111	\$41 <b>0</b>	40					N.R.													
	5400	1				EX	PLA	NATI	ON.											
EXPLANATION STANDARD PE												D PER	ETRAT	ION TEST						

## E TYPES

A - INDICATES SOLID AUGER

A - INDICATES HOLLOW AUGER

C . INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

INDICATES CORE RECOVERY



INDICATES WATER LEVEL AND DATE RECORDED

INDICATES CORE LOSS

RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES, REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

~~ OJEC	T:	NTE PRO	PROJECT NO: 1-2762-3106								BORING NO: T3-3						
<b>a</b>				TOTAL DEPTH: 30'													
		90 DATE FINISHED:						<u>DO</u>			REVIEWED BY: LW						
TYPE AND SIZE OF HOLE ELEVATION (FEET)		90	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION	PENETRATION RESISTANCE	Τ	CORE RECOVERY	2	TEST SECTIONS	FIELD PERMIABILITY CM./SEC.	LAB PERMIABILITY CH./SEC,	SING 200	PLASTIC LIMIT (X)	LIQUID LIMIT (%)	DRY DENSITY (PCF)	NOTES	
5A : 1495 5A : 1495 1548 15	10-			SAND, clayey to silty, with gravel lenses, dry to medium moist, very dense, red brown with gray lenses (SC-SM with GC-GM)  SAND, clayey, slightly silty, occasional volcanic cobble, occasional quartz stringer, very dense, dry, brownish red to red (SC)	92.6 60/9 51/6 53/6												

# HOLE TYPES

SA - INDICATES SOLID AUGER

HA - INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R . INDICATES ROTARY HOLE

# EXPLANATION

INDICATES
CORE RECOVERY

INDICATES WATER
LEVEL AND DATE
RECORDED

INDICATES
CORE LOSS

# STANDARD PENETRATION TEST

RECORDED AS, NUMBER
OF BLOWS WITH A 140 POUND
HAMMER, FALLING 30 INCHES,
REQUIRED TO DRIVE A STANDARD
SAMPLER INCHES.

P1	ROJ	EC1	r:	Ε	SCALA	NTE PR	PROJECT NO: 1-2762-3106									RINĞ	NO:	-4	_		
	•						TAL D	EPTI	4:		19.										
 D						80 DATE FINISHED: 3/18/80	0: 3/18/80 LOGGED BY: 00									REVIEWED BY: LW					
TYPE AND CIZE	OF HOLE	ELEVATION (FEET)	DEPTH (FEET)	GRAPHIC LOG	WATER LEVEL	LITHOLOGY AND PHYSICAL CONDITION	PENETRATION RESISTANCE	R Q D (X)	CORE RECOVERY	TEST SECTIONS	FIELD PERMIABILITY CM./SEC.	LAB PERMIABILITY CM./SEC.	A PASSING 200	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	DRY DENSITY (PCF)		NOTES			
l's		1376 1366 1366		2//////////////////////////////////////		SAND, clayey, slightly silty, occasional volcanic cobble, dense, dry, red (SC)	73/9 N.R.				2-10	34	43	24	57						
	************		وووادي ووووو																		

## HOLE TYPES

A - INDICATES SOLID AUGER

. INDICATES HOLLOW AUGER

C - INDICATES CORE HOLE

R - INDICATES ROTARY HOLE

### EXPLANATION

INDICATES CORE RECOVERY

INDICATES WATER RECORDED

INDICATES CORE LOSS

# STANDARD PENETRATION TEST

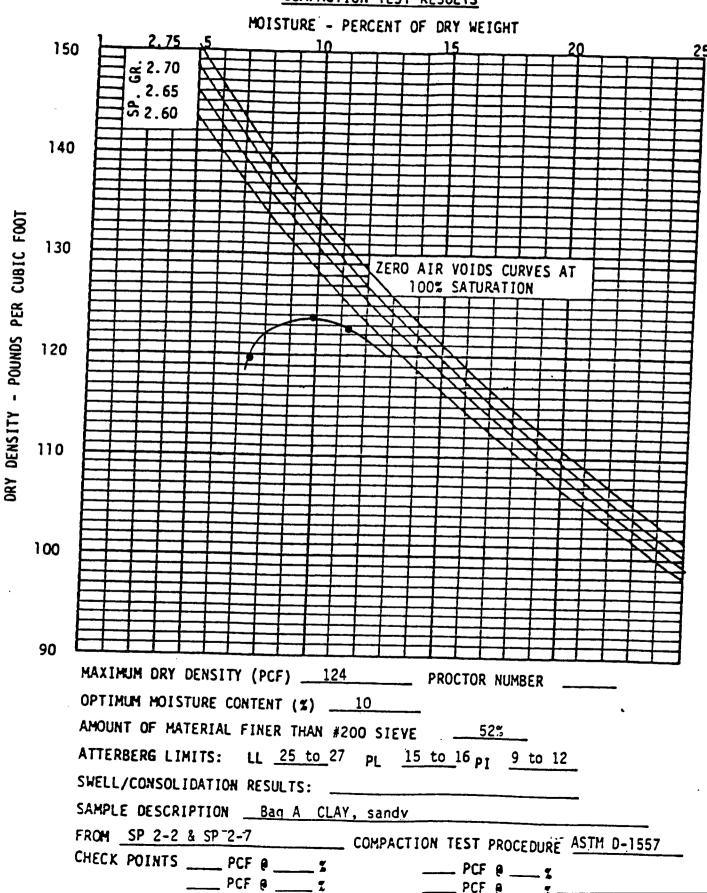
RECORDED AS, NUMBER OF BLOWS WITH A 140 POUND HAMMER, FALLING 30 INCHES, REQUIRED TO DRIVE A STANDARD SAMPLER INCHES.

APPENDIX B
PREVIOUS LABORATORY INVESTIGATION

FOX Consulting Engineers and Geologists

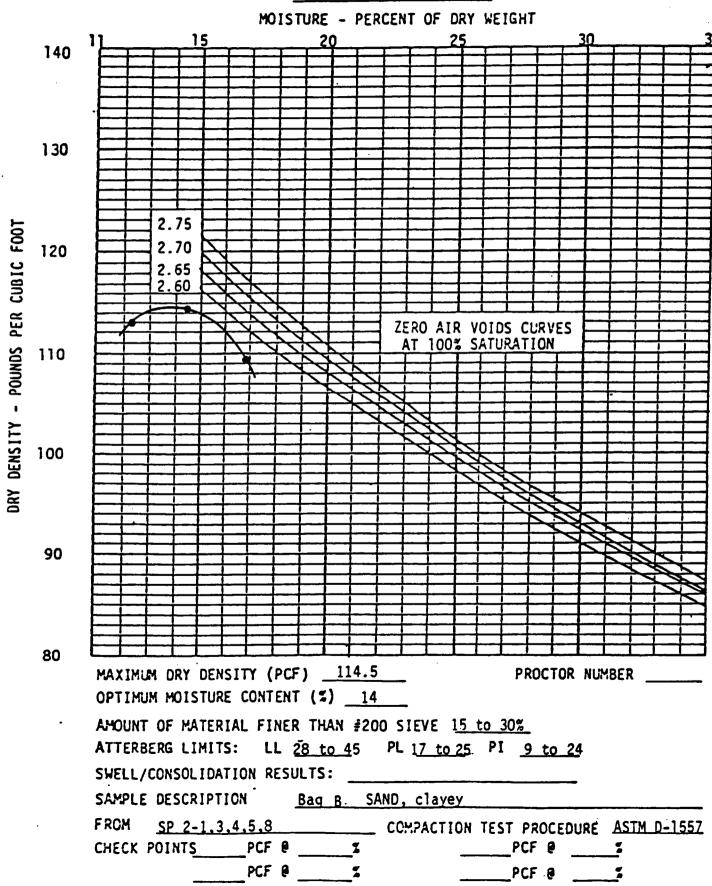
4765 INDEPENDENCE STREET
WHEAT RIDGE, COLORADO 80033
(303) 424-5578 — FMFOX

# COMPACTION TEST RESULTS



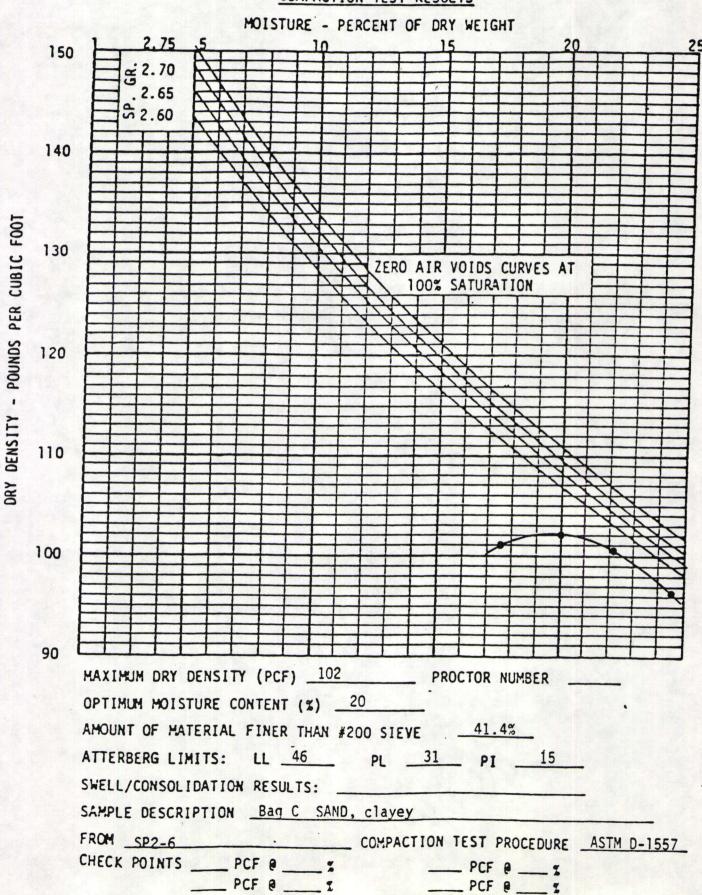
F.M. FOX & ASSOCIATES, INC. 4765 INDEPENDENCE STREET WHEAT RIDGE, COLORADO 80033 (303) 424-5578 — FMFOX

# COMPACTION TEST RESULTS



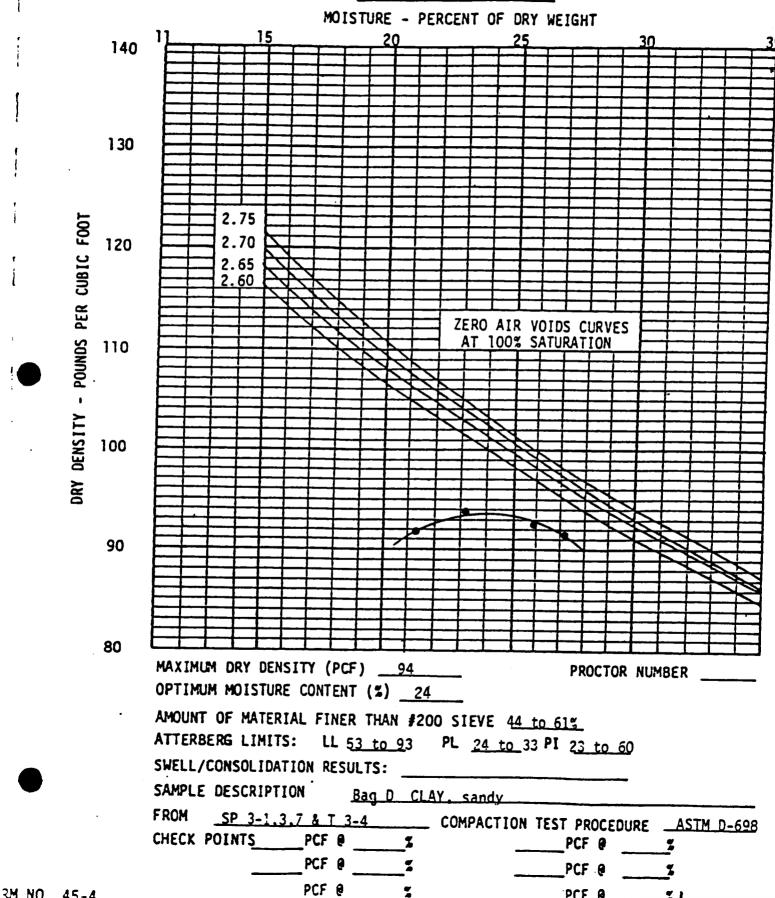
DCE A

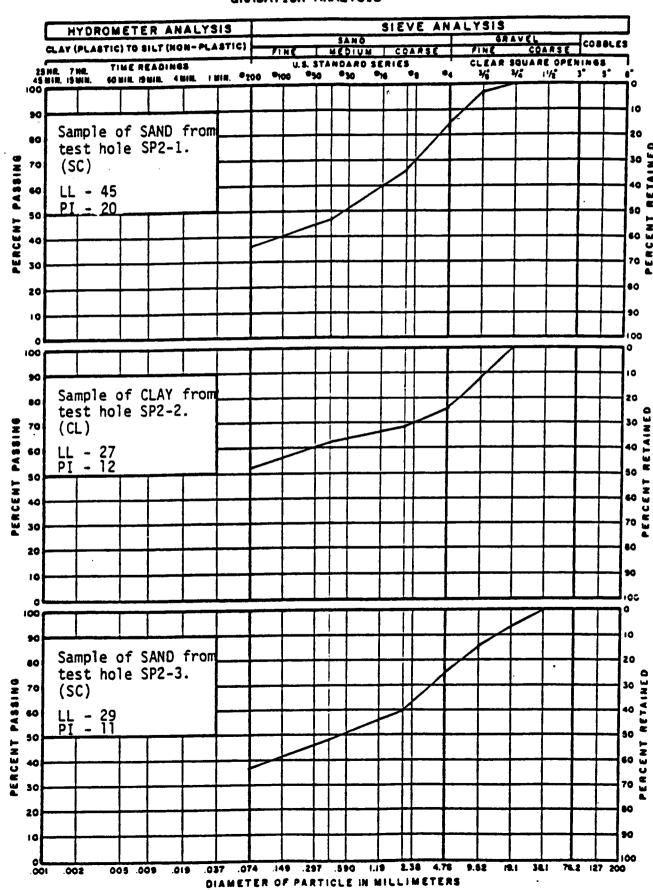
# COMPACTION TEST RESULTS

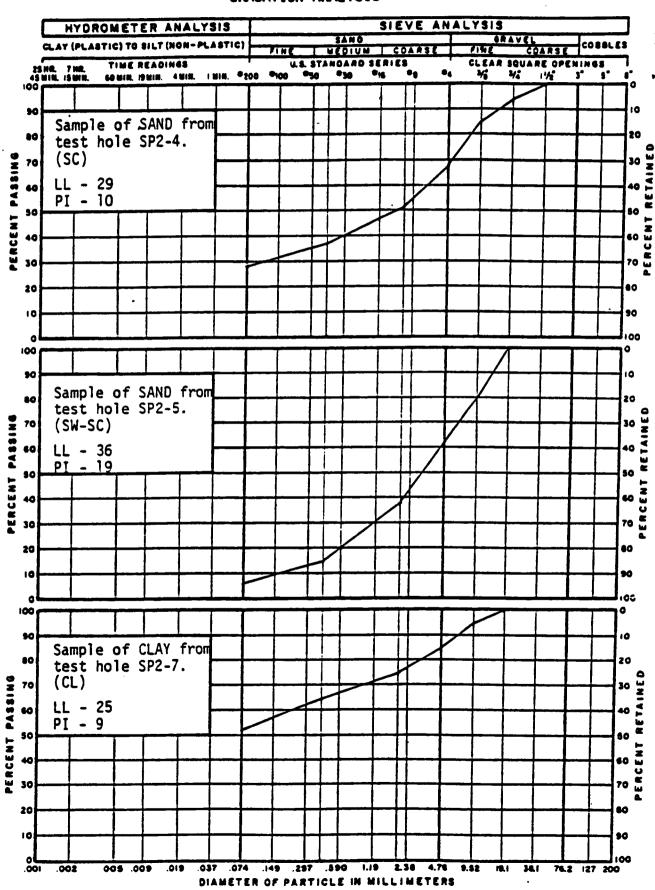


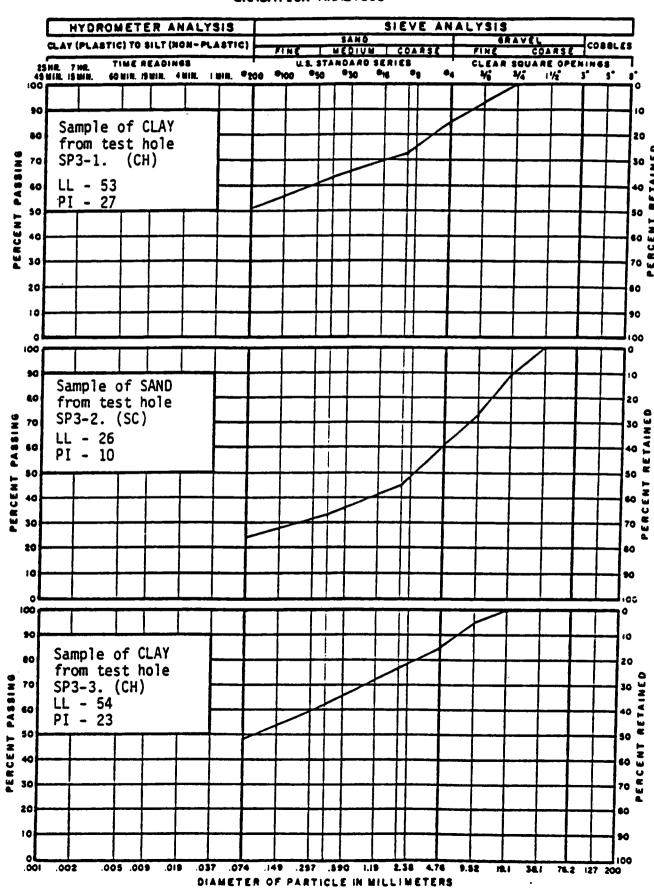
F.M. FOX & ASSOCIATES, INC. (303) 424-5578 - FMFOX

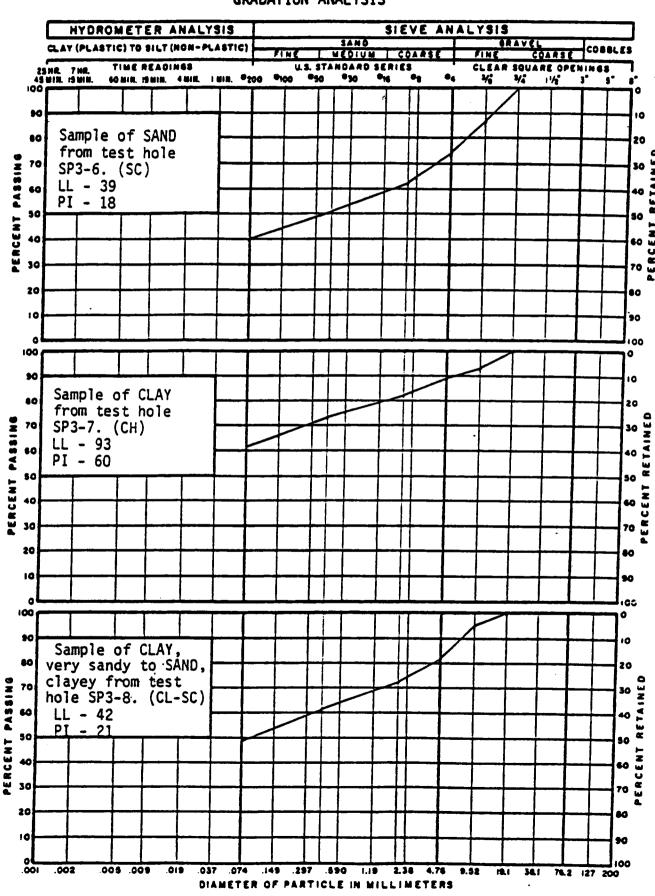
# COMPACTION TEST RESULTS



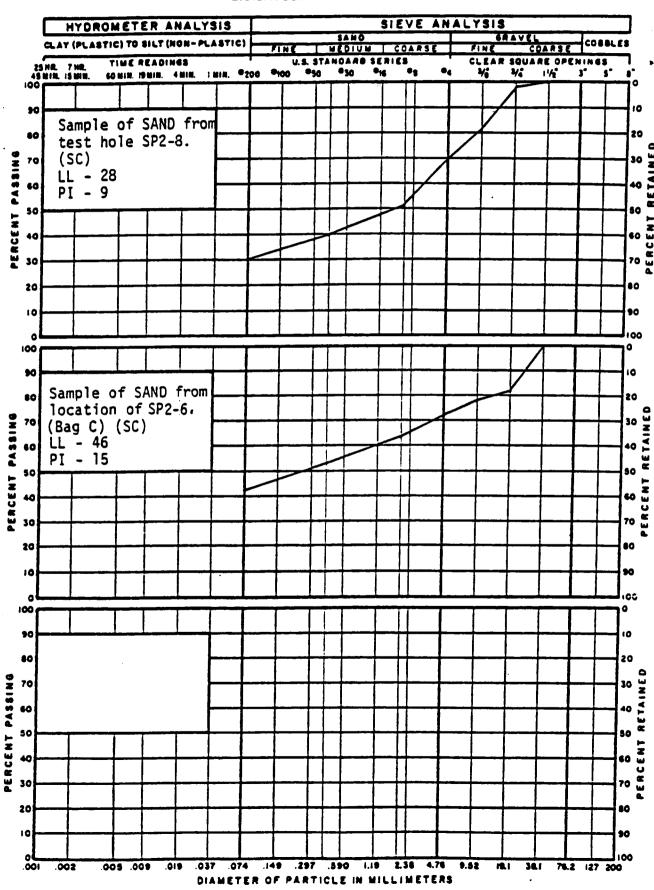




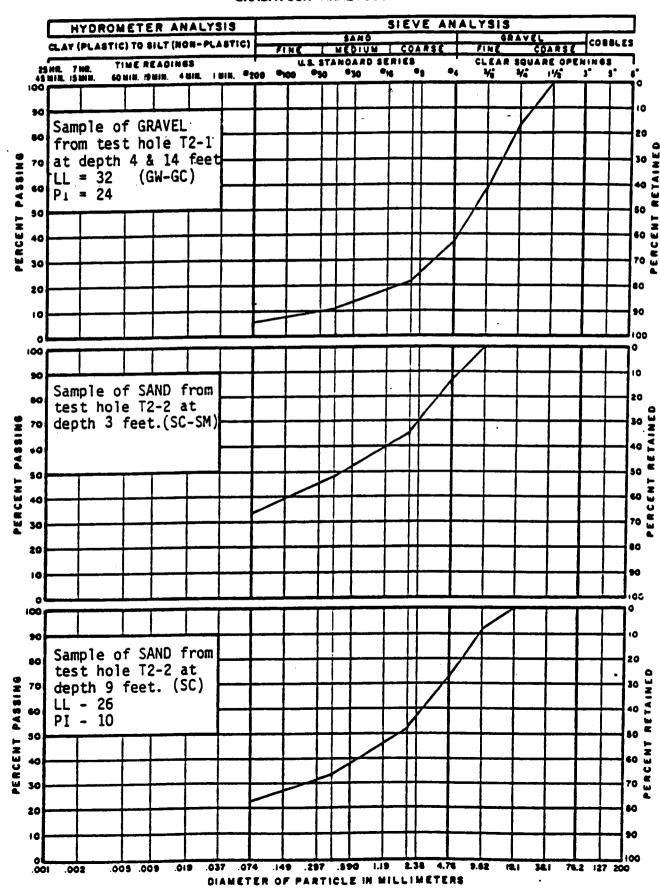


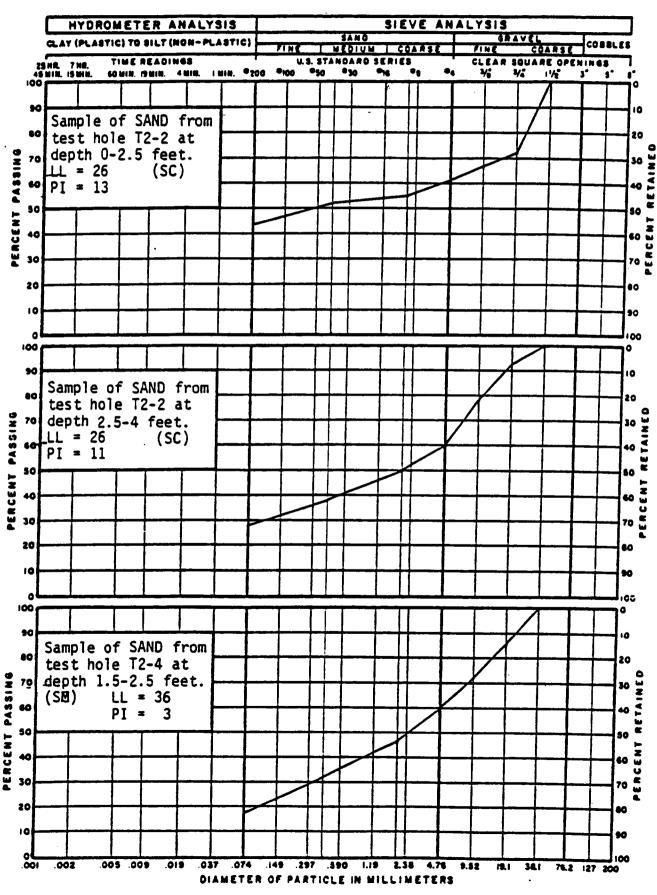


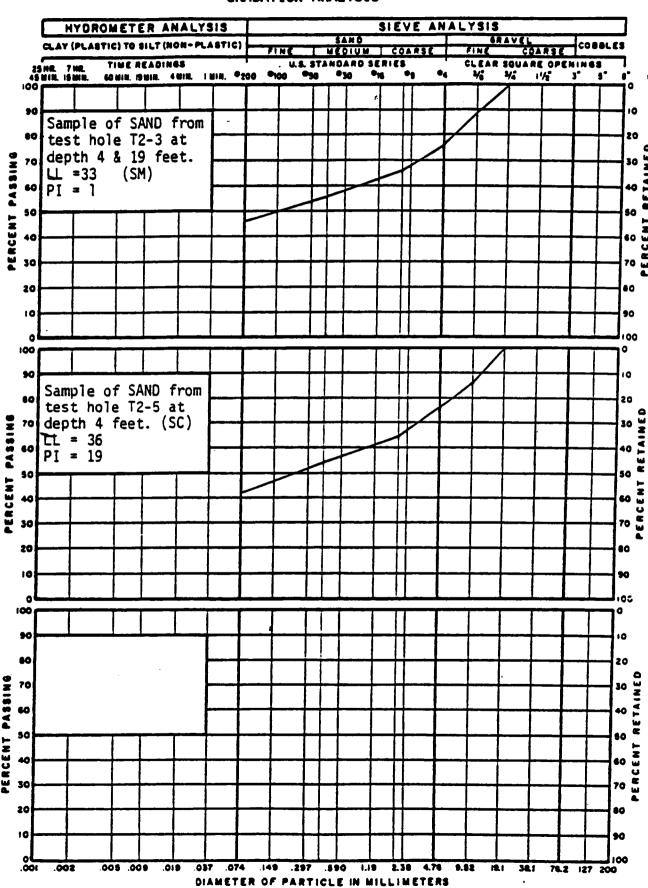
# **GRADATION ANALYSIS**

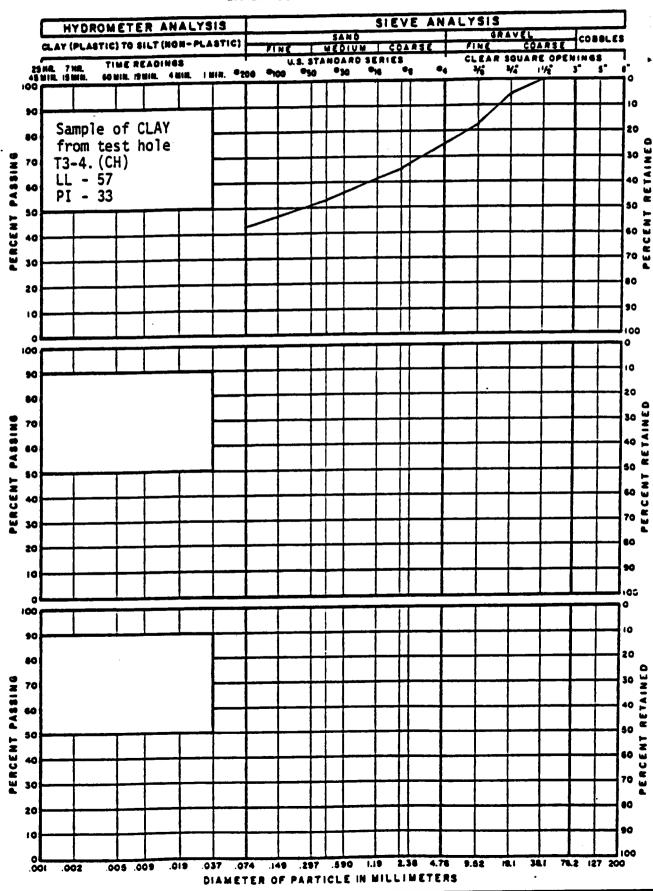


.... 1-1...

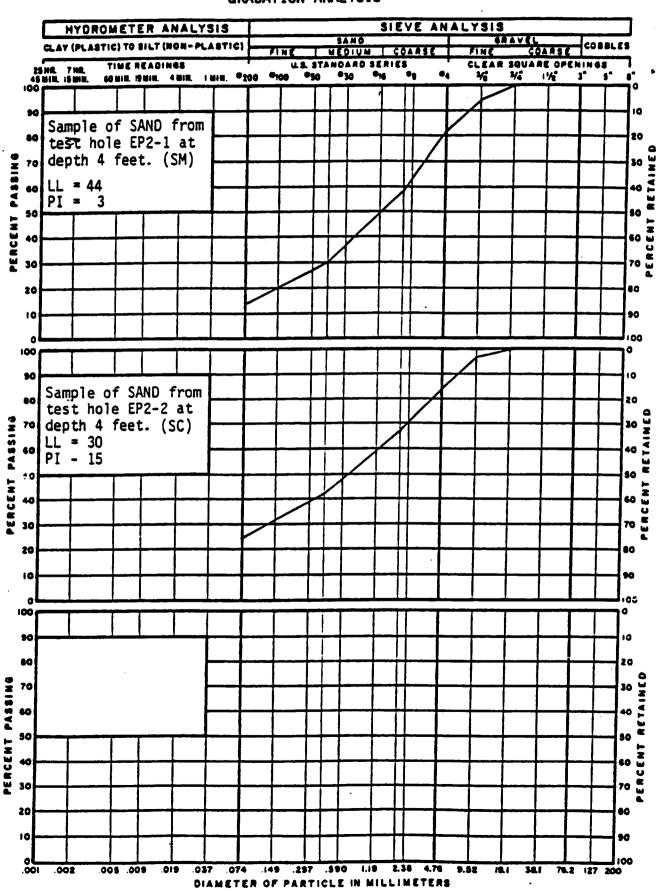








# **GRADATION ANALYSIS**



.... I-...

GEOTECHNICAL INVESTIGATION FOR

LINER BORROW MATERIAL

ESCALANTE SILVER MINE/TAILING DAM

IRON COUNTY, UTAH

5/83

Prepared For

Ranchers Exploration and Development Corporation

Job No. 1-2664-3429 May 5, 1983

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# GENERAL

This report presents the results of a subsoil investigation conducted at the site of the Escalante Silver Mine/Tailing Dam located in portions of Sections 2, 3 and 10 of Township 36 South, Range 17 West, Salt Lake P.M., Iron County, Utah. The purpose of this investigation is to provide subsoil information pertinent to the proposed stage 2 and 3 expansions of the existing tailing dam structure. This investigation was conducted to delineate the areas near the existing dam which contain suitable material for use as fill in the liner construction.

The information presented in this report is based upon the data collected during this and previous field investigations conducted at the site. Factual data generated during this investigation, including the results of the field and laboratory investigations, are presented on Figures 1 through 14.

In conjunction with this investigation, tailing discharge samples were collected and standpipe permeability tests conducted. Data generated from this phase of the investigation will be used for future analyses and is not presented as part of this report.

# FIELD INVESTIGATION

The field investigation consisted of excavating 45 test pits across various areas encompassing the existing tailing dam. Refer to Figure 1 for test pit locations. Test pits were excavated using a backhoe. Each test pit was lithologically logged and disturbed bulk bag samples collected. Test pits were excavated to a depth at which nonsuitable liner materials were encountered. All samples were field classified and packaged for shipment to our Las Vegas Laboratory for subsequent testing.

### LABORATORY INVESTIGATION

The disturbed bulk bag samples collected during the field investigation were carefully opened, catalogued and classified by the project engineer. Inspection of the samples followed the procedures outlined in ASTM D-2488, Standard Recommended Practice Description of Soils (Visual-Manual Procedure). Representative samples from each soil group and/or test pit were chosen for subsequent laboratory testing. Laboratory testing program consisted of classification testing including Atterberg Limits and Gradational Analysis. All laboratory tests were conducted in accordance with appropriate ASTM procedures. Refer to Figures 3 through 14 for laboratory test results.

### SUBSOIL CONDITIONS

Refer to the Logs of Tests Pits, Figure 2, for detailed lithological logs of the subsoil conditions encountered in each test pit during the field investigation. Generally, the subsoils encountered across the site consisted of 6 to 10 inches of topsoil over a mixture of silty to clayey sands over a mixture of silty to clayey sands and gravels. A portion of the silty to clayey sands and gravels were cemented with calcium carbonate.

For the purpose of this investigation, we have further delineated subsoil conditions in a more specific manner as outlined below. Refer to Figure 1 for locations of the test pits and Figure 2 for lithological logs.

# Area One (Test Pits F1 through F3)

The subsoils encountered in area one consisted of approximately 0.5 to 0.8 feet of topsoil over 1.5 and 3.5 feet of <u>clayey to silty sands</u> over a mixture of silty to clayey sands and gravels.

## Area Two (Test Pits F4 through F6)

Subsoils encountered in area two consisted of approximately 0.5 to 0.8 feet of topsoil over 1.5 to 3.0 feet of <u>clayey to silty sand</u> over a mixture of silty to clayey sands and gravels.

# Area Three (Test Pits F-7 through.F-12)

The subsoils encountered in area three consisted of approximately 0.5 to 0.8 feet of topsoil over 2 to 3 feet of <u>clayey to silty sand</u> over a mixture of silty to clayey sands and gravels. However, test pit 7 encountered 2 feet of silty sand over the mixture of silty to clayey sands and gravels, which is not suitable for liner material.

## Area Four (Test Pits F-13 through F-16)

Subsoils encountered in area four consisted of approximately 0.5 to 0.8 feet of topsoil over 2.0 to 3.0 feet of <u>clayey to silty sand</u> over a mixture of silty to clayey sands and gravels. However, test pit 15 encountered approximately 2.0 feet of silty sand over the mixture of silty to clayey sands and gravels, which is not suitable for liner material.

# Area Five (Test Pits F-17 through F-20)

The subsoils encountered in area five consisted of approximately 0.5 to 0.8 feet of topsoil over 1.0 to 2.0 feet of <u>clayey to silty sand</u> over a mixture of silty to clayey sands and gravels.

# Area Six (Test Pits F-21 through F-26)

The soils encountered in area six consisted of approximately 0.3 to 0.8 feet of topsoil over 1.5 to 3.0 feet of <u>clayey to silty sand</u> over a mixture of silty to clayey sands and gravels. However, test pit F-21 encountered approximately 2.5 feet of silty sand over the mixture of silty to clayey sands and gravels, which is not suitable for liner material.

# Area Seven (Test Pits F-27 through F-30)

The subsoils encountered in area seven were somewhat eratic, and were

generally not acceptable for use as liner material. Test pits F-27 and F-28 encountered 1.0 to 2.5 feet of silty sand over a mixture of silty to clayey sands and gravels. Test pits F-29 and F-30 encountered 1.0 feet of clay to silty sand over a mixture of silty to clayey sands and gravels.

# Area Eight (Test Pits F-31 through F-35)

The subsoils encountered in area eight are not suitable for use as liner material. The soils exposed in each of the five test pits in this area consisted of silty sands to the total depth explored, 3.0 feet.

# Area Nine (Test Pits F-36 through F-39)

The subsoils encountered in area nine consisted of approximately 0.5 to 0.8 feet of topsoil over 2.5 to 4.0 feet of <u>clayey to silty sand</u> with traces of gravels over a mixture of silty to clayey sands and gravels.

# Area Ten (Test Pits F-40 through F-45)

Area ten can be divided into two minor areas. The first minor area includes test pits F-40 through F-42, and the second test pits F-43 through F-45. The subsoils encountered in test pits F-40 through F-42 consisted of approximately 0.5 to 0.8 feet of topsoil over 1.5 to 2.0 feet of clayey to silty sands over a mixture of silty to clayey sands and gravels. Test Pits F-43 through F-45 were excavated further up the draw and encountered 0.5 to 0.8 feet of topsoil over 1.0 to 2.0 feet of silty sand over a mixture of silty to clayey sands and gravels. The soils in the area of test pits F-43 through F-45 are not suitable for use as liner material.

# DISCUSSION

Based upon the liner specifications and the results of our field and laboratory investigations, we have outlined below the areas which are the most desireable sources for liner material. In addition, we have calculated the minimum quantities of liner material which can be expected to be encountered in

each area.

Generally the upper clayey to silty sand is suitable for use as liner material; however, some reprocessing may be required. In addition, the 0.5 to 0.8 feet of topsoil will have to be stripped from the surface and stockpiled for later use. The areas where the silty sands were encountered will not be a suitable source for liner material. This includes areas 7, 8, and the upper portion of area 10.

It is recommended that areas 1 through 5, which are located across the interior of the presently fenced impoundment, be the first areas overexcavated for liner material. The calculated quantity of clayey to silty sand in these areas is approximately 23,000 cubic yards. The next area which should be overexcavated for fill material is area 6. Test pits F-21 through F-26 are located in this area, and based upon the data generated from these test pits the quantity of clayey to silty sand for liner fill is approximately 37,000 cubic yards. Once the liner fill material has been removed from this area, area 9 should then be overexcavated and the liner material in this area used. The quantity of liner fill material calculated in this area is approximately 35,000 cubic yards. If additional liner material is still required, the lower portion of area 10, and the area below the downstream toe of the existing embankment may be overexcavated for liner fill material. Overexcavation in these areas should yield an excess of 100,000 cubic yards of liner fill material.

If you have any questions regarding this matter or desire additional consultation, do not hesitate to contact us.

F. M. FOX & ASSOCIATES, INC.

Donald L. Taylor, dr.

Project Geotechnical Engineer

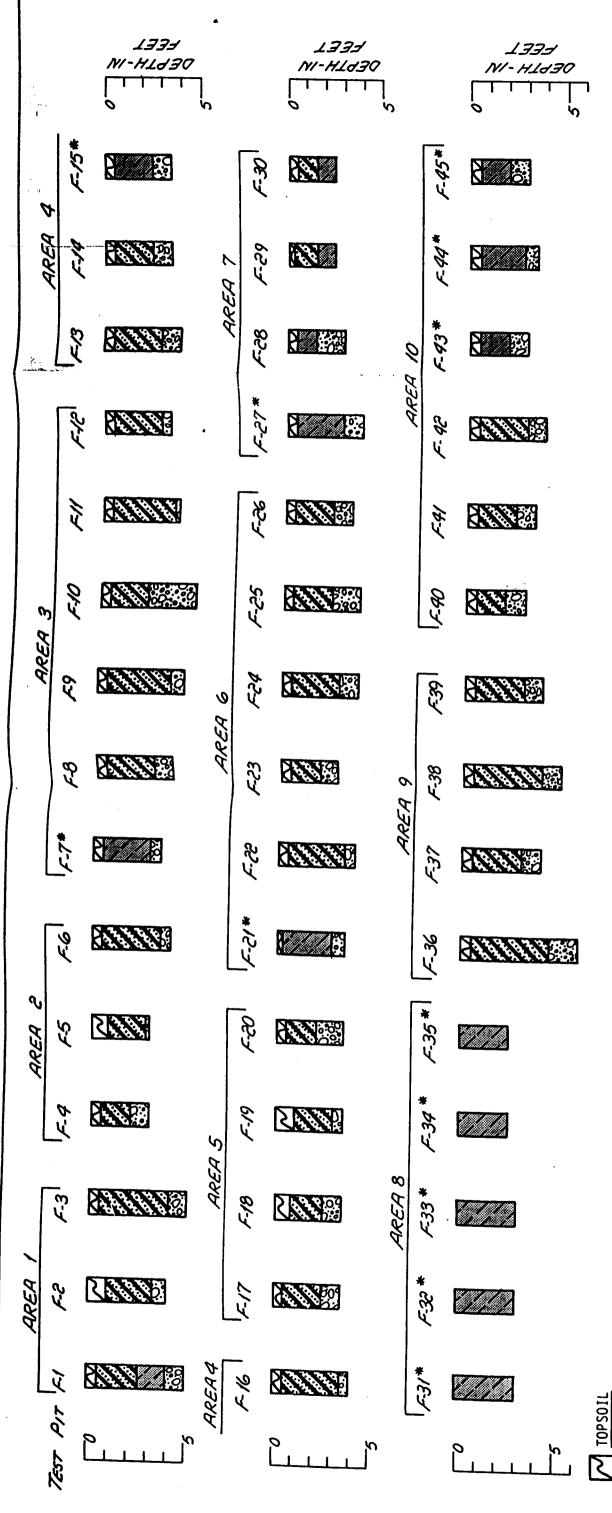
Reviewed by:

Regan A. Heath

Principal Geological Engineer

DLT/tid





- SAND, clayey to silty with some clay lenses, trace of gravels noted, slightly calcerous in part, loose to dense, slightly moist to moist, light brown to brown (SC SM)
- calcerous cementation, some cobbles noted, dense, slightly moist to moist, dense to very dense SM to GC/GM) SAND, silty, slightly calcerous and clayey in part, traces of gravels noted, loose to dense, light brown to brown (SM) SAND & GRAVEL, silty and clayey, buff to brown (SC/

# NOTES

- 1. Test pits excavated on March 30 and 31, 1983 with a backhoe.
- 2. No free-water found in test pits at time of excavating.
- The stratification lines represent the approximate boundary between soil types and the transition may be gradual.
- c] ient survey data supplied by the ngs were approximately determined by The location/elevation of bor

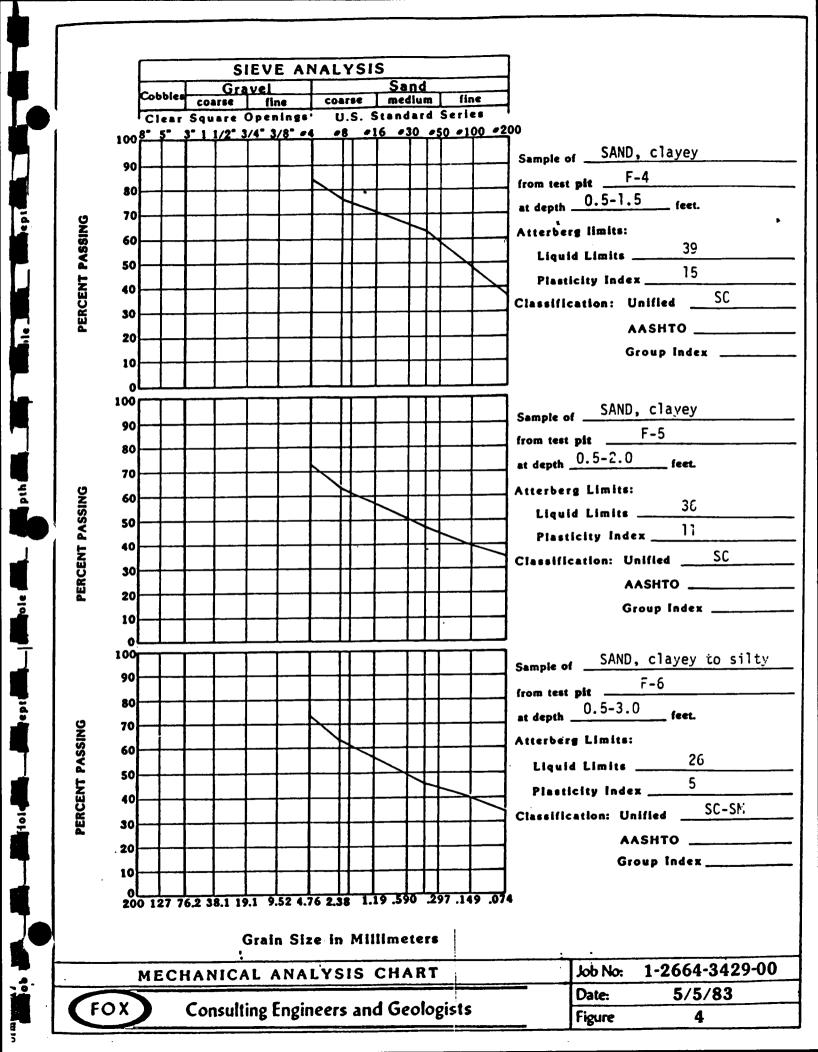
\*NOTE: Indicates material in test pits which did not meet liner specifications.

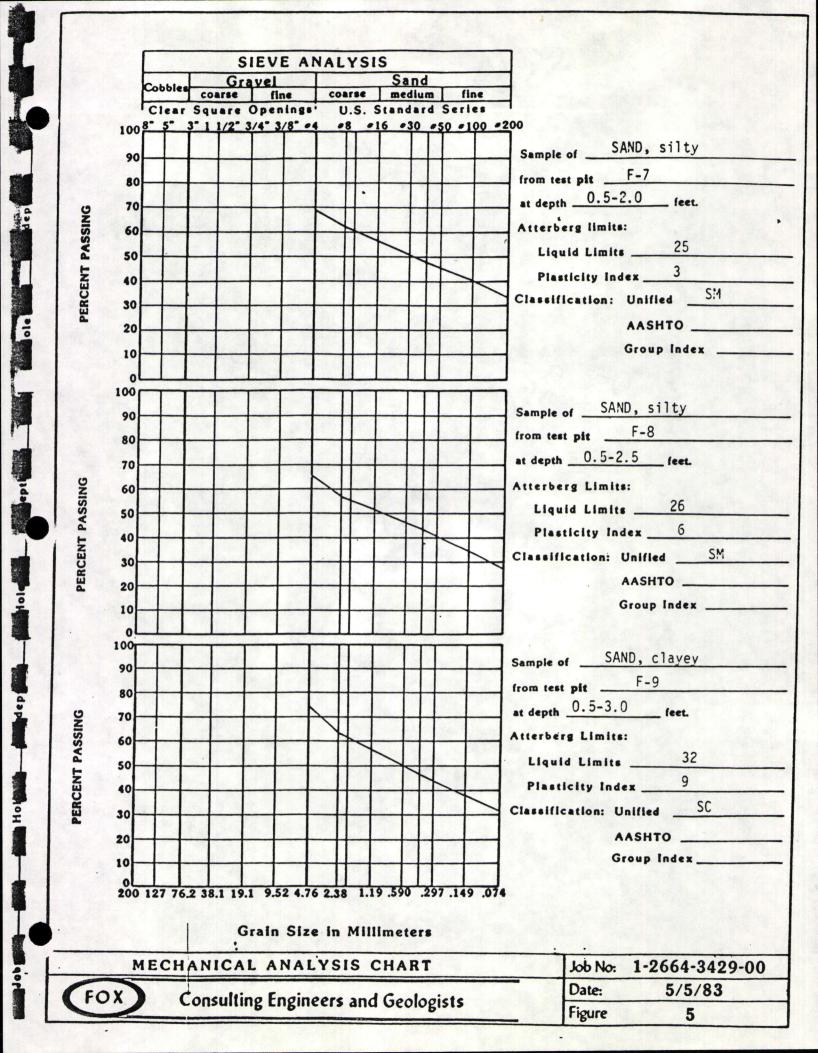
I FIIS	and Geologists		6.
LUGS OF IEST PILS	Consulting Engineers and Geologists	1-2664-3429-00	4/15/83 Figure
	Fox	Job No: 1-2	Date: 4/1

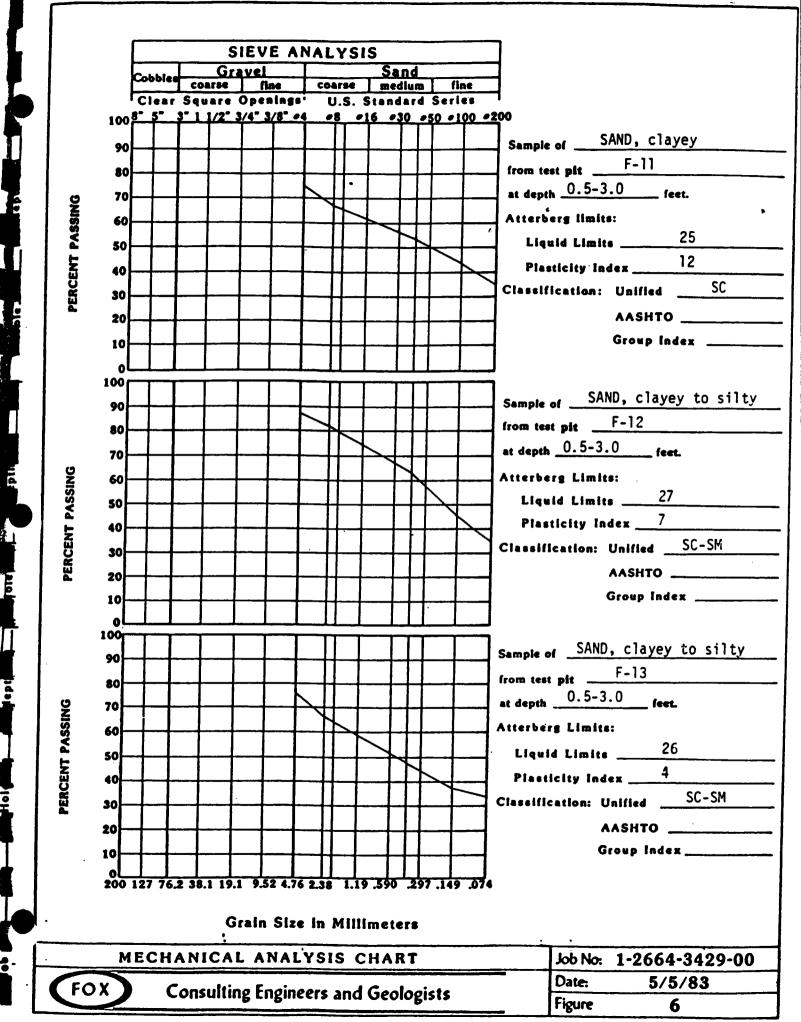
SIEVE ANALYSIS Sand Gravel Cobbles coarse fine coarse medium fine Clear Square Openings' U.S. Standard Series 1008 5 3 1 1/2 3/4 3/8 +4 #8 #16 #30 #50 #100 #200 Sample of SAND, clayey to silty 90 from test pit \_\_\_\_ F-1 at depth 0.5-3.0 feet. 70 PERCENT PASSING Atterberg limits: 60 Liquid Limits \_\_\_\_ Plasticity Index \_\_\_\_\_ Classification: Unified \_\_ SC-SM 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 100 Sample of SAND, clayey 90 from test pit \_\_\_\_F-2 80 at depth 1.5-3.0 feet. 70 PERCENT PASSING Atterberg Limits: 60 Liquid Limits 37 50 Plasticity Index \_\_\_\_\_13 40 Classification: Unified SC 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_ 10 100 Sample of SAND, clayey to silty 90 from test pit F-3 80 at depth 2.0-4.0 feet. PERCENT PASSING 70 Atterberg Limits: 60 Liquid Limits \_\_\_\_\_ 50 Plasticity Index \_\_\_\_ 40 Classification: Unified SC-SM 30 AASHTO \_\_\_\_ 20 Group Index \_\_\_\_\_ 10 200 127 76.2 38.1 19.1 9.52 4.76 2.38 1.19 .590 .297 .149 .074 Grain Size in Millimeters MECHANICAL ANALYSIS CHART Job No: 1-2664-3429-00 5/5/83 Date: Consulting Engineers and Geologists

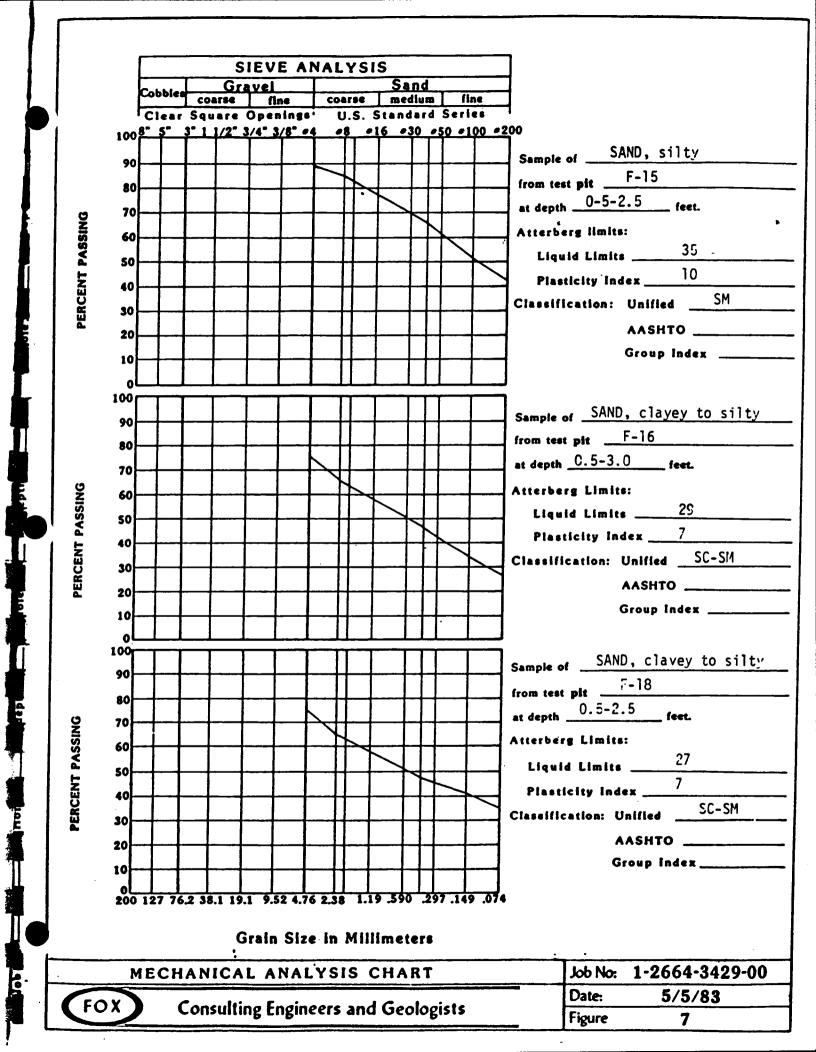
**Figure** 

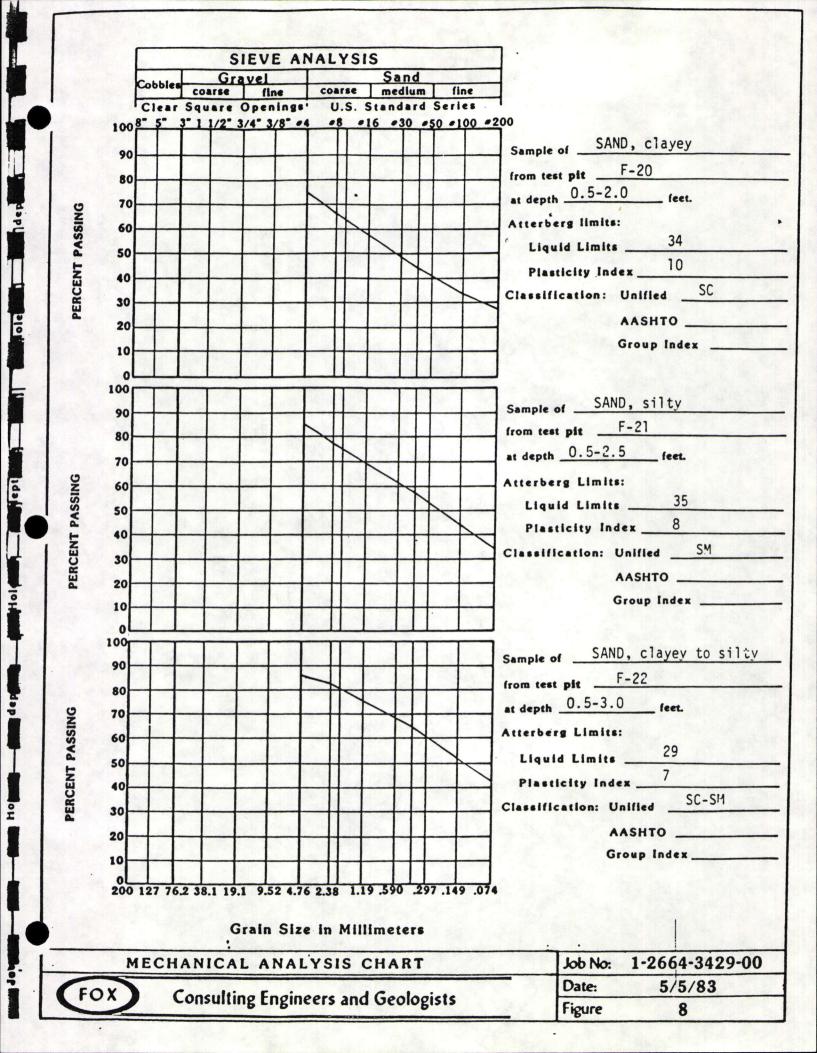
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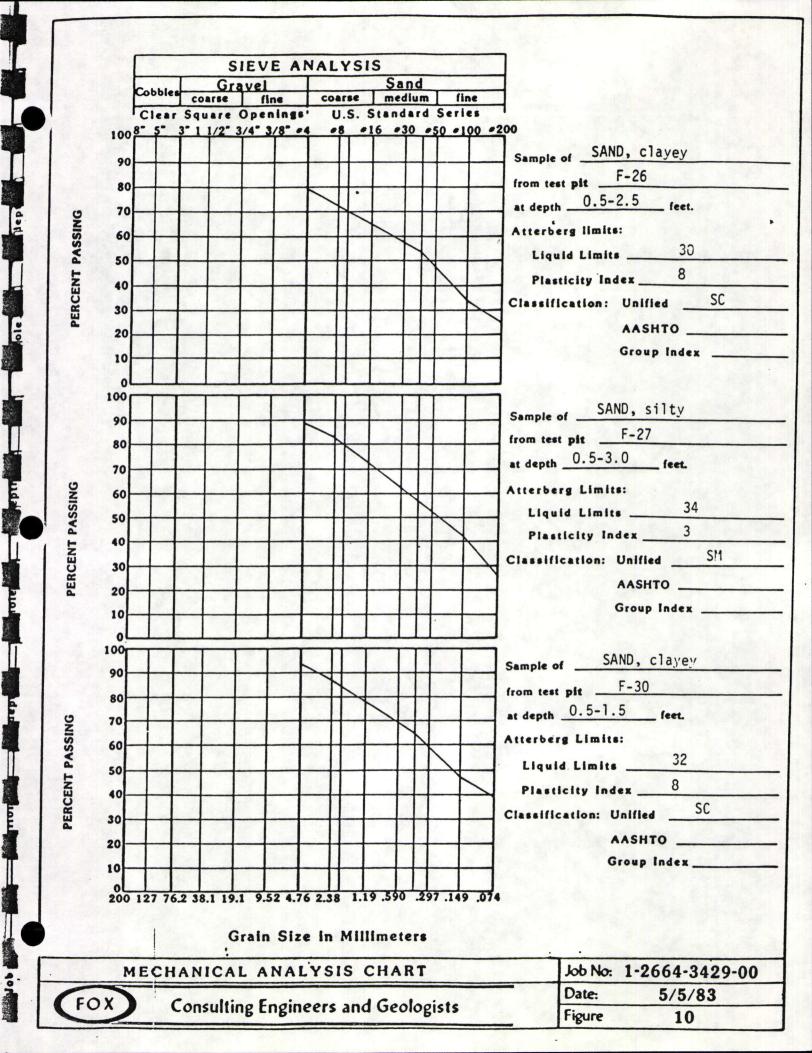




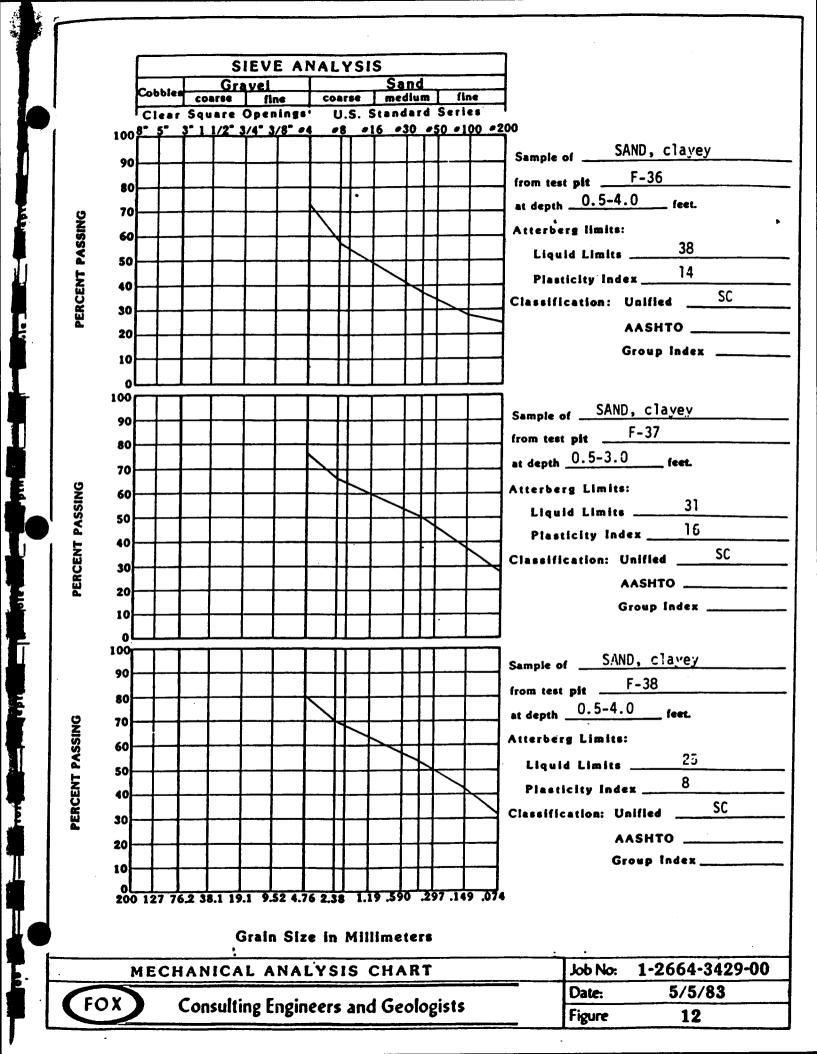


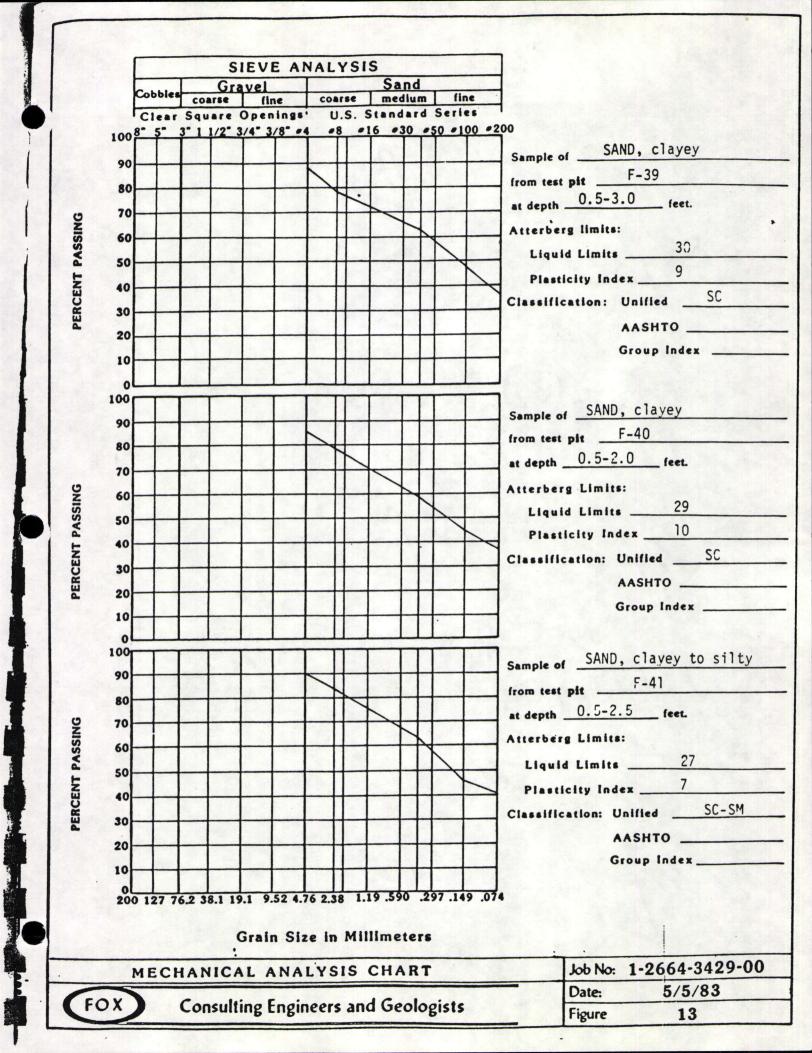


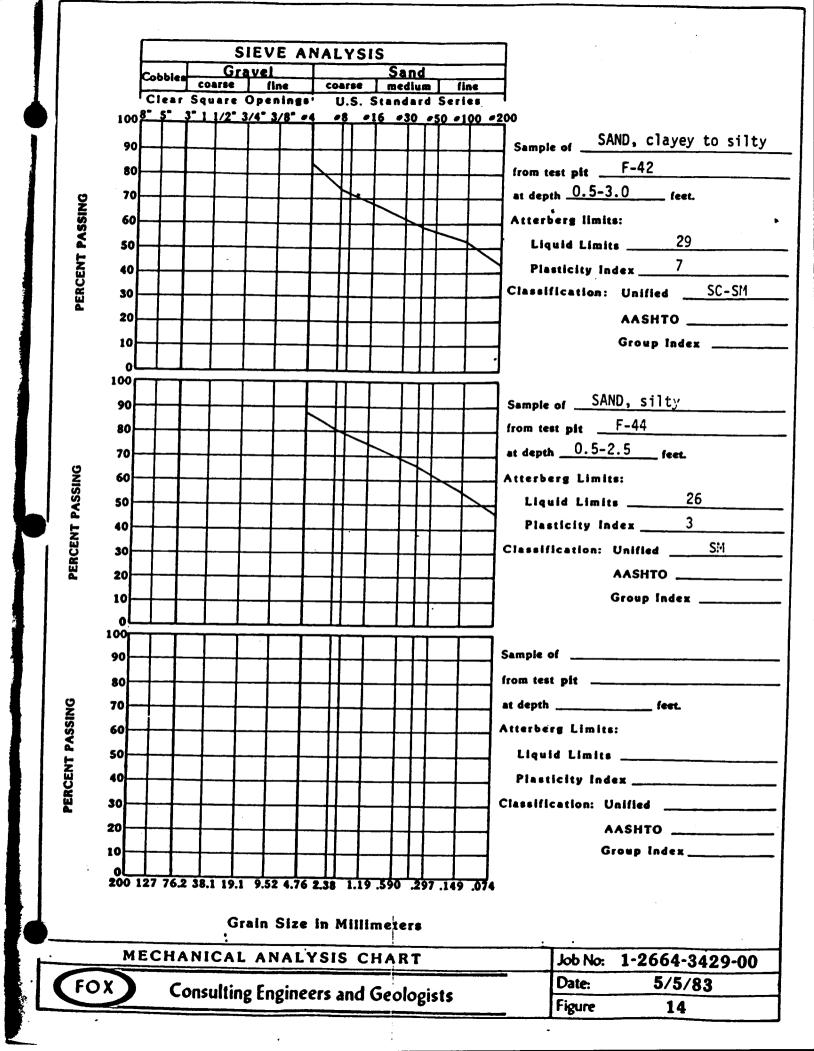
SIEVE ANALYSIS Gravel coarse medlum U.S. Standard Series Clear Square Openings' **08 016 030 050 0100 02**00 3" 1 1/2" 3/4" 3/8" -4 Sample of SAND, clayey from test pit \_\_\_F-23 80 at depth 0.5-2.0 feet. 70 PERCENT PASSING Atterberg limits: 60 Liquid Limits \_\_\_\_ Plasticity Index 25 40 Classification: Unified SC 30 AASHTO \_\_\_\_\_ 20 Group index \_\_\_ 10 100 Sample of SAND, clayev to silty from test pit F-24 80 at depth 0.5-3.0 feet 70 Atterberg Limits: PERCENT PASSING 60 Liquid Limits \_\_\_\_ 50 Plasticity Index \_\_\_\_ 40 Classification: Unified SC-SM AASHTO \_\_\_\_\_ 20 Group Index \_\_\_\_\_ 10 Sample of CLAY, sandy 90 from test pit F-25 80 at depth 0.5-2.5 PERCENT PASSING Atterberg Limits: Liquid Limits \_\_\_ 50 13 Plasticity Index \_\_ Classification: Unified \_\_\_\_ 30 AASHTO \_\_\_\_ 20 Group Index \_\_\_\_ 10 Grain Size in Millimeters Job No: 1-2664-3429-00 MECHANICAL ANALYSIS CHART 5/5/83 Date: Consulting Engineers and Geologists Figure



SIEVE ANALYSIS coarse medium fine Clear Square Openings' U.S. Standard Series 3" 1 1/2" 3/4" 3/8" -4 Sample of SAND, silty 90 from test pit F-31 80 at depth 0.5-1.5 feet. 70 PERCENT PASSING Atterberg limits: 60 Liquid Limits \_\_\_ 43 50 Plasticity Index \_\_\_\_\_\_10 40 Classification: Unified \_\_\_ 30 AASHTO \_\_\_\_ 20 Group Index \_\_ 10 100 Sample of SAND, silty 90 from test plt F-33 80 at depth 0.5-2.0 feet 70 PERCENT PASSING Atterberg Limits: Liquid Limits \_\_\_\_\_48 50 Plasticity Index \_\_\_\_ 40 Classification: Unified \_\_\_\_\_ AASHTO \_\_\_\_ 20 Group Index \_ 10 0 100 Sample of SAND, silty from test plt \_\_\_F-35 80 at depth 0.5-1.5 feet. 70 Atterberg Limits: 60 Liquid Limits \_\_\_\_ 50 Plasticity Index \_\_\_ 40 Classification: Unified \_\_\_ 30 AASHTO \_\_\_\_\_ 20 Group Index \_\_\_ 10 Grain Size in Millimeters MECHANICAL ANALYSIS CHART Job No: 1-2664-3429-00 Date: 5/5/83 Consulting Engineers and Geologists Figure 11









### FOX CONSULTANTS, INC.

DENVER OFFICE 710 KIPLING STREET, SUITE 400 DENVER, COLORADO 80215 (303) 233-7799

INSPECTION OF 1983 CONSTRUCTION
STAGES 2 and 3
TAILINGS DAM AND POND LINER
AT THE
ESCALANTE SILVER MINE

Prepared for:

Ranchers Exploration and Development Corp.

Job No. 01-1120

30 November 1983

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### 4.0 LINER MATERIAL BORROW INVESTIGATION

### 4.1 INTRODUCTION

Excavation of liner material from previously located areas inside the tailings impoundment fence and the west end of Borrow Area No. 2 during July and August indicated that quantities were generally less than those predicted on the basis of the April 1983 preliminary test pit program. The results of the preliminary test pit program are reported in the <u>Tender Documents for Construction of Expansion Stages II and III for the Escalante Silver Tailings Dam</u>, dated May 11, 1983. The liner material deposits, which generally exist as thin valley-bottom veneers, were found to be highly erratic vertically and horizontally. An extensive backhoe test pit program was undertaken from September 6 to September 12, 1983 to confirm actual quantities in known borrow sources, and to locate additional sources of acceptable soil to make up the predicted shortfall.

### 4.2 PROCEDURE

The borrow investigation consisted of approximately 175 test pits which are located on Figures 1 through 6 in Appendix E. Most of the test pits were excavated with Ranchers' small, rubber-tired backhoe. When this machine became unavailable, a Case 680G backhoe was hired to complete the test pit program.

Test Pits 83-68 to 83-81 were excavated with a Caterpillar D-9 bulldozer.

The soils encountered in the test pits were visually classified by the engineer in the field. Visual and tactile clues were generally sufficient to determine whether or not the soils met the liner material specifications of 25% or more minus #200 sieve particles which must classify above the A-line on the Unified Soils Classification System's plasticity chart. Occassionally, marginal soils were sampled and tested in the field laboratory as back-up for visual classification.

# 4.3 RESULTS

The typical soil stratigraphy encountered consisted of 6 inches to 12 inches of topsoil (SM-ML) overlying 0 inches to 18 inches of liner types soil (SC-CL, occasionally GC), underlain by unknown depths of silty sand or silty sand and gravel with varying degrees of calcareous cementation (SM-GM). More detailed stratigraphic data is shown on the test pit logs in Appendix

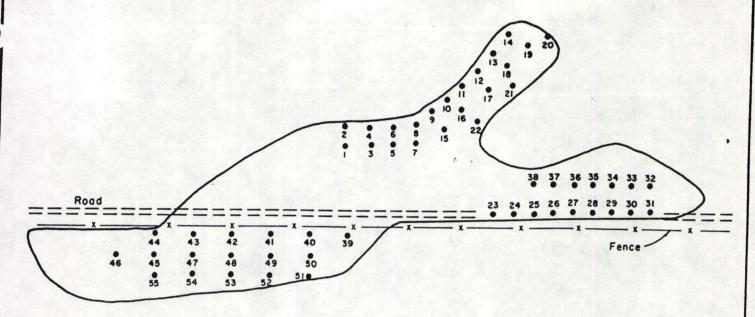
Liner material quantity estimates for each of the investigated areas are listed in Table 1. The F series test pits are from an earlier borrow investigation described in the May 5, 1983 F. M. Fox & Associates, Inc. report entitled Investigation for Liner Borrow Material, Escalante Silver Mine/Tailings Dam.

DATE	April 1983	April 1983 9/6, 9/7 and 9/9/83 April 1983	9/8/83	9/7/83	9/8/83	9/8/83	9/9/83	9/12/83	9/12/83	9/12/83	9/12/83	9/8/83	April 1983 April 1983
ESTIMATED QUANTITY OF LINER MATERIAL	¥ Eby 000,81 = 18,000 %2 = 18	- 5,000 yd ≈	≈ 20,500 yd³ /	¥ 15,000 yd³ Limited	Limited	_	≅ 3,500 yd³ Limited	£ by 000, μ ≅	Limited	Limited	Limited to None ≥ 18,000 yd³	≅ 4,000 yd³ Limited to None	None
PERTINENT TEST PITS	F1 to F20 F21 to F26	TP83-1 to TP83-55 F36 to F39 TP83-56 to TP82-63	TP83-63 to TP83-81		TP83-176 to TP83-179	TP83-180 to TP83-181		1 P 8 3 - 1 1 2 1 to T P 8 3 - 1 2 6 T P 8 3 - 1 2 7 to T P 8 3 - 1 4 0	TP83-141 to TP83-142 TP83-143	TP83-144 to TP83-147	TP83-82 to TP83-121	F40 to F45	F27 to F35
SITE	× Borrow Area 1* ✓ Borrow Area 2*	Area 3	✓ Borrow Area 4*  Area 5	Area 6 Area 7	Area 8	Area 9 Area 10	Area 11	Area 13	Area 14 Area 15	Area 16 Area 17	Area 18 Area 19	Area 20	

<sup>\*</sup>Borrow Areas used during 1983 construction program.

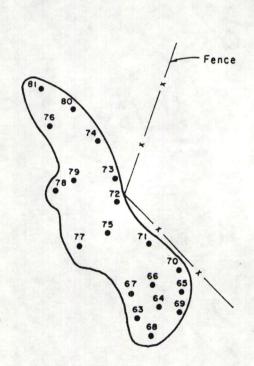
April 1983





Plan View

### BORROW AREA 2



Plan View

BORROW AREA 4

· Test pit

Scale : 1"= 500'

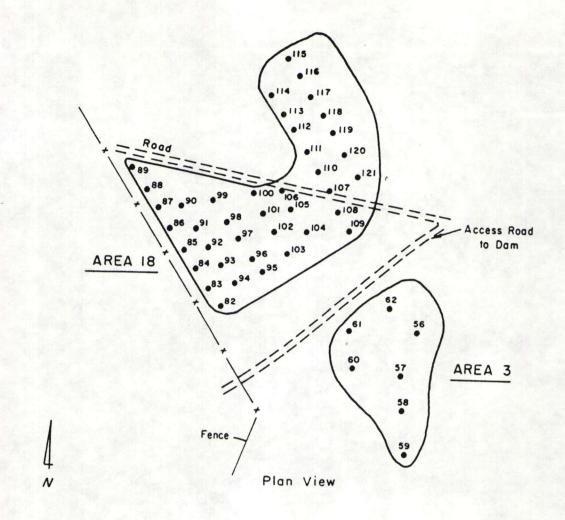
NOTE: Test pit locations are approximate.

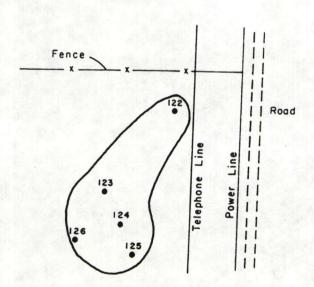
# FOX CONSULTANTS, INC.

Borrow Investigation Test Pit Locations Borrow Areas 2 and 4

DATE: 11/83 DFT. BY: JOB NO. 01-1120

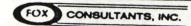
Figure 2





Plan View AREA 12 • Test Pit

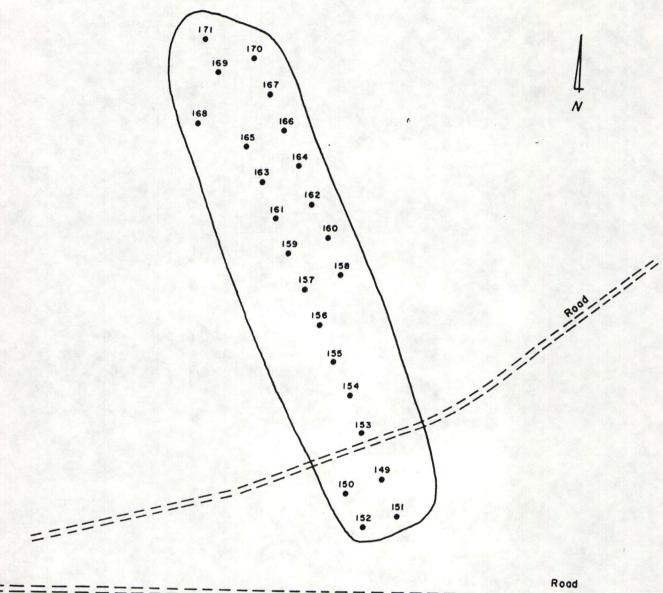
Scale : 1"= 500"



Borrow Investigation Test Pit Locations Areas 3, 12 and 18

DATE: 11/83 DFT. BY: Figure 3

NOTE: Test pit locations are approximate.



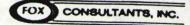
Plan View

AREA 5

· Test pit

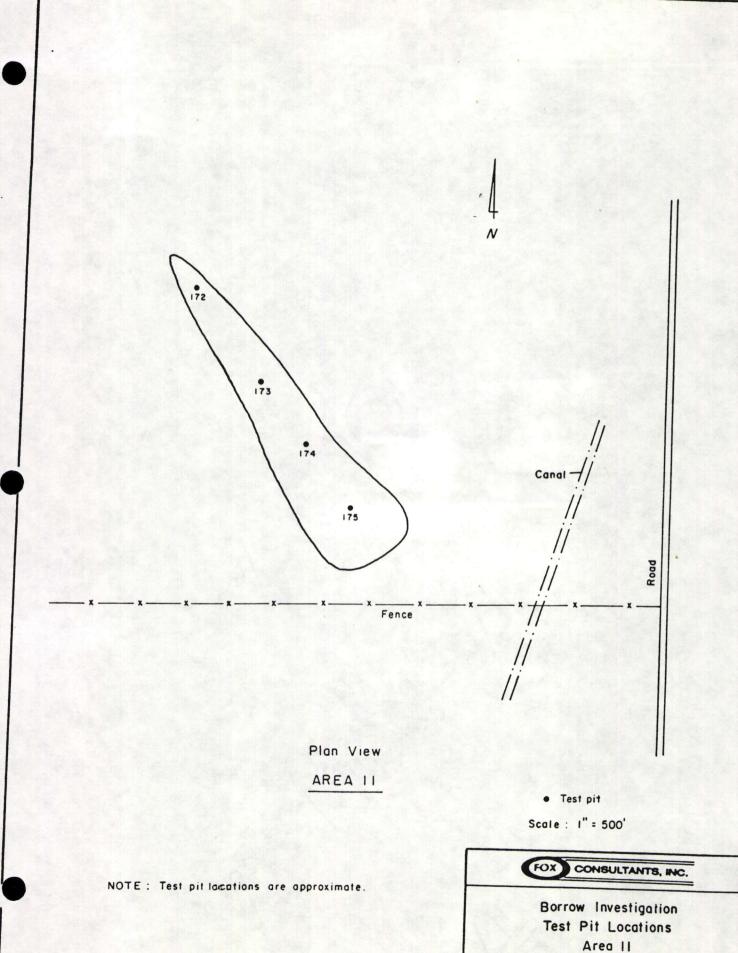
Scale : 1" = 500'

NOTE: Test pit locations are approximate.

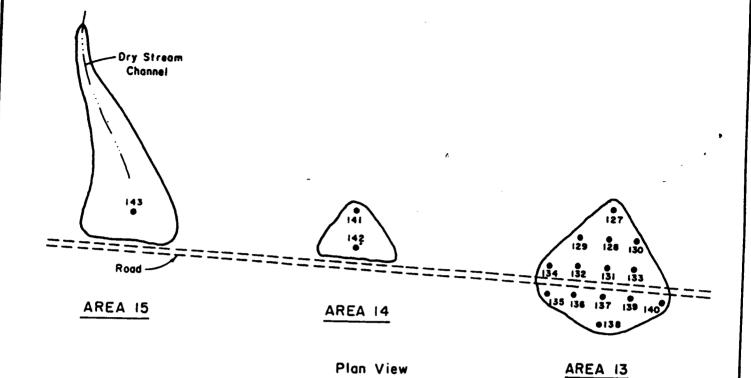


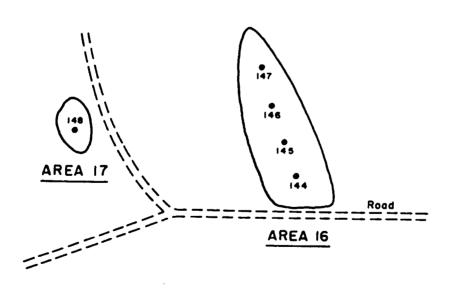
Borrow Investigation Test Pit Locations Area 5

DATE: 11/83 DFT. BY: Figure 4



DATE: 11/83 | DFT. BY: Figure 5

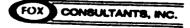




Plan View

• Test pit

Scale : I" = 500'



Borrow Investigation Test Pit Locations Areas 13, 14, 15, 16 and 17

NOTE: Test pit locations are approximate.

DATE: 11/83 DFT.87: Figure 6

TP 83-1	0" - 9" 9" - 36"	Topsoil: clayey with roots Silty Sand: white
TP83-2	0" - 9" 9" - 24"	Topsoil Silty Sand: , white
TP83-3	0" - 9" 9" - 12" 12" - 30"	Topsoil Clayey Sand Silty Sand: white
TP83-4	0" - 8" 8" - 16"	Topsoil SIIty Sand: white
TP83-5	0" - 12" 12" - 24"	Topsoil Silty Sand: white
TP83-6	0" - 12" 12" - 48"	Topsoil Silty Sand: white
TP83-7	0" - 9" 9" - 26" 26" - 38"	Topsoil Clayey Sand: brown Silty Sand: white
TP83-8	0" - 9" 9" - 18"	Topsoil Silty Sand: white
TP83-9	0" - 6" 6" - 9" 9" - 18"	Topsoil Clayey Sand Silty Sand: white
TT83-10	0" - 6" 6" - 9" 9" - 18"	Topsoil Clayey Sand Silty Sand: white
TP83-11	0" - 6" 6" - 9" 9" - 18"	Topsoil Clayey Sand Silty Sand: white
TP83-12	0" - 6" 6" - 18" 18" - 30"	Topsoil Clayey Sand Silty Sand: white
TP83-13	0" - 9" 9" - 21" 21" - 30"	Topsoil Clayey Sand: brown Clayey Sand and Gravel: brown with white dappling

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TP83-14	0" - 6"	Topsoil
	6" - 12"	Clayey Sand: brown
	12" - 21"	Silty Sand: white
		Jinty June: Write
TP83-15	0" - 9"	Topsoil
	9" - 15"	Silty Sand: brown
	15" - 30"	Sand, some silt
	.5	Sand, some sint
TP83-16	0" - 6"	Topsoil
	6" - 12"	Clayey Sand: with roots
	12" - 30"	Clayey Sand, some Gravel
	30" - 32"	Silty Sand: white
	30 32	Sitty Sand. Wille
TP83-17	0" - 6"	Topsoil
	6" - 18"	Clayey Sand: brown
	18" - 24"	Silty Sand: white
		Sifty Sand. Write
TP83-18	0" - 6"	Topsoil
	6" - 18"	Clayey Sand
	18" - 21"	Silty Sand
		Sifty Saila
TP83-19	0" - 9"	Topsoil
	9" - 21"	Clayey Sand: brown
	21" - 30"	Silty Sand: white
	2.	Sifty Sand. White
TP83-20	0" - 6"	Topsoil
	6" - 18"	Silty Sand: light brown
	18" - 24"	Silty Sand: white
		only said. Write
TP83-21	0" - 6"	Topsoil
	6" - 12"	Clayey Sand
	12" - 18"	Silty Sand
		Sifty Saile
TP83-22	0" - 6"	Topsoil
	6" - 9"	Clayey Sand
	9" - 12"	Silty Sand
		Sirty Sand
TP83-23	0" - 6"	Topsoil
	6" - 18"	Clayey Sand, some Gravel: reddish brown
	18" - 30"	Silty Sand, some Gravel
	.0 50	Sitty Salid, Some Graver
TP83-24	0" - 6"	Topsoil
	6" - 12"	보는 경우 보다는 보다는 사람들은 이 집 보는 사람들은 살이라고 있다면 하는데 이 보면 하는 사람들이 하는데 나를 살아왔다.
		Clayey Sand, some Gravel: brown
TP83-25	0" - 6"	Topsoil
03 23	6" - 24"	
	¥ 27	Clayey Sand, some Gravel: reddish brown
	24" - 30"	Silty Sand, some Gravel: white
	2 7 30	Sitty Salid, Some Graver: White

TP83-26	0" - 6"	Topsoil
	6" - 18"	Clayey Sand, some Gravel: light brown
	18" - 20"	Silty Sand, some Gravel: white
		only sand, some oraver. Write
TP83-27	0" - 6"	Topsoil
	6" - 12"	Clayey Sand, some Gravel: reddish
		browh
	12" - 24"	Silty Sand, some Gravel: white
		only some stayer. Write
TP83-28	0" - 6"	Topsoil
	6" - 9"	Clayey Sand, some Gravel: reddish
		brown
	9" - 18"	Silty Sand, some Gravel: white
		Sitty Sand, Some Graver. Wille
TP83-29	0" - 6"	Topsoil
	6" - 12"	Clayey Sand, some Gravel: light brown
	12" - 18"	Silty Sand, some Gravel: white
		only sand, some Graver. Write
TP83-30	0" - 9"	Topsoil
	9" - 15"	Silty Sand, some Gravel: white
		one, sand, some Graver. Write
TP83-31	0" - 9"	Topsoil
	9" - 24"	Clayey, Gravelly Sand: light brown
	24" - 27"	Silty Sand, some Gravel: white
		William States
TP83-32	0" - 12"	Topsoil
	12" - 18"	Clayey Sand: light brown
	18" - 21"	Silty Sand, some Gravel: white
TP83-33	0" - 9"	Topsoil
	9" - 48"	Clayey Sand (<25% minus #200 sieve)
	48" - 51"	Silty Sand, some Gravel: white
TP83-34	0" - 9"	Topsoil
	9" - 15"	Clayey Sand, some Gravel: light brown
	15" - 48"	Clayey Sand and Gravel (<25% minus #200
		sieve)
	48" - 51"	Silty Sand, some Gravel: white
TP83-35	0" - 6"	Topsoil
	6" - 18"	Clayey Sand, some Gravel: light brown
	18" - 36"	Clayey Sand and Gravel: reddish brown
		(<25% minus #200 sieve)
	36" - 39"	Silty Sand, some Gravel: white

TP83-36	0" - 6"	Toncoil
11 05 50	6" - 15"	Topsoil
	15" - 18"	Clayey Sand, some Gravel: light brown
	13 - 16	Clayey Sand and Gravel: light brown
		(<25% minus #200 sieve)
TP83-37	0" - 6"	Topsoil "
	6" - 12"	Clayey Sand, some Gravel: light brown
	12" - 42"	Clayey Sand and Gravel: light brown
		(<25% minus #200 sieve)
TP83-38	0" - 6"	Topsoil
	6" - 18"	Clayey Sand, some Gravel: light brown
	18" - 30"	Clayey Sand and Gravel: light brown
TP83-39	0" - 6"	Topsoil
	6" - 12"	Clayey Sand: brown
	12" - 18"	Silty Sand, some Gravel: white
TP83-40	0" - 6"	Topsoil
	6" - 30"	Clayey Sand, some Gravel
	30" - 33"	Silty Sand: white
TP83-41	0" - 6"	Topsoil
	6" - 36"	Clayey Sand, some Gravel
	36" - 48"	Clayey Gravel
TP83-42	0" - 6"	Topsoil
	6" - 30"	Clayey Sand, some Gravel
	30" - 42"	Clayey Sand and Gravel
TP83-43	0" - 6"	Topsoil
	6" - 24"	Clayey Sand, some Gravel
	24" - 36"	Clayey Sand and Gravel
TP83-44	0" - 9"	Tonsoil
11 03 44	9" - 18"	Topsoil Silty Sand
	18" - 24"	Silty Sand and Gravel
		Sitty Saile and Graver
TP83-45	0" - 6"	Topsoil
	6" - 36"	Clayey Sand, some Gravel
	36" - 39"	Clayey Sand and Gravel
TP83-46	0" - 9"	Topsoil
	9" - 21"	Clayey Sand
	$21^{n} - 24^{n}$	Clayey Sand and Gravel

TP83-47	0" - 9" 9" - 36" 36" - 39"	Topsoil Clayey Sand, some Gravel Clayey Sand and Gravel
TP83-48	0" - 6" 6" - 21" 21" - 24"	Topsoil Clayey Sand Silty Sand: white
TP83-49	0" - 6" 6" - 18" 18" - 27"	Topsoil Clayey Sand Silty Sand: white
TP83-50	0" - 6" 6" - 12" 12" - 18"	Topsoil Clayey Sand Silty Sand: white
TP83-51	0" - 9" 9" - 12"	Topsoil Silty Sand: white
TP83-52	0" - 9" 9" - 15" 15" - 18"	Topsoil Clayey Sand Silty Sand: white
TP83-53	0" - 9" 9" - 15" 15" - 18"	Topsoil Clayey Sand Silty Sand: white
TP83-54	0" - 6" 6" - 18" 18" - 24"	Topsoil Clayey Sand Silty Sand: white
TP83-55	0" - 6" 6" - 18"	Topsoil Silty Sand
TP83-56	0" - 6" 6" - 19" 19" - 30" 30" - 33"	Topsoil Silty Sand: brown, some roots Clayey Sand and Gravel: brown Silty Sand: white
TP83-57	0" - 6" 6" - 30" 30" - 36" 36" - 39"	Topsoil Clayey Sand: brown Clayey Sand and Gravel: brown Silty Sand: white
TP83-58	0" - 6" 6" - 24"	Topsoil Clayey Sand and Gravel, some Cobbles: brown
	24" - 27"	Silty Sand: white

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TP83-59	0" - 6"	Topsoil
	6" - 18"	Clayey Sand
	18"	Bedrock
		Beurock
TP83-60	0" - 9"	Topsoil
	9" - 24"	Clayey Sand
	24" - 27"	Silty Sand: white
TP83-61	0" - 6"	Topsoil
	6" - 24"	Clayey Sand, some Gravel and Cobbles
	24" - 27"	Silty Sand: white
TD00 00		
TP83-62	0" - 6"	Topsoil
	6" - 12"	Clayey Sand
	12" - 18"	Silty Sand: white
TDOO CO		
TP83-63	0" - 6"	Topsoil
	6" - 30"	Clayey Sand and Gravel
	30" - 36"	Silty Sand and Gravel
TP83-64	011 611	
11-03-04	0" - 6"	Topsoil
	6" - 33"	Sandy Clay, some Gravel
	33" - 36"	Silty Sand: white
TP83-65	0" - 6"	Topsoil
	6" - 30"	
	30" - 39"	Sandy Clay, some Gravel
	30 39	Clayey Sand and Gravel
TP83-66	0" - 6"	Topsoil
	6" - 18"	
	18" - 24"	Sandy Clay, some Gravel
		Silty Sand
TP83-67	0" - 6"	Topsoil
	6" - 18"	Clayey Sand, some Gravel
	18" - 24"	Silty Sand: white
		Sitty Saild. White
TP83-68	0" - 6"	Topsoil
	6" - 15"	Clayey Sand, some Gravel
	15" - 24"	Clayey Sand and Gravel
		orayey sand and Graver
TP83-69	0" - 6"	Topsoil
	6" - 18"	Clayey Sand
	18" - 24"	Clayey Sand and Gravel, some Cobbles
		city of said and Graver, some Cobbles
TP83-70	0" - 9"	Topsoll
	9" - 12"	Silty Sand and Gravel, some Cobbles
		only said did of aver, some Copples

TP83-71	0" - 6"	Topsoil
	6" - 36"	Clayey Sand
TP83-72	0" - 24"	Topsoil
	24" - 36"	Clayey Sand and Gravel
TP83-73	0" - 21"	Topsoil
	21" - 36"	Clayey Sand, some Gravel
TP83-74	0" - 6"	Topsoil
	6" - 24"	Clayey Sand, some Gravel
TP83-75	0" - 6"	Topsoil
	6" - 12"	Clayey Sand
	12" - 18"	Silty Sand: white
		distribution in the literature of the same
TP83-76	0" - 6"	Topsoil
	6" - 18"	Clayey Sand
	18" - 21"	Silty Sand
		Sifty Sand
TP83-77	0" - 6"	Topsoil
	6" - 24"	Clayey Sand, some Gravel
		Clayey Salid, Sollie Gravel
TP83-78	0" - 9"	Topsoil
	9" - 24"	Clayey Sand and Gravel
		orayey sama and oraver
TP83-79	0" - 9"	Topsoil
	9" - 24"	Clayey Sand
	24" - 36"	Silty Sand and Gravel
TP83-80	0" - 6"	Topsoil
	6" - 30"	Clayey Sand
	30" - 42"	Clayey Sand and Gravel
TP83-81	0" - 6"	Topsoil
	6" - 18"	Gravelly Sand
	18" - 24"	
		Silty Sand, some Gravel
TP83-82	0" - 5"	Topsoil
	5" - 11"	Silty Sand: brown
	11" - 24"	Silty Sand: white
TD02-03	011 611	
TP83-83	0" - 6"	Topsoil
	6" - 11"	Silty Sand: brown
	11" - 16"	Silty Sand: white

TP83-84	0" - 6"	Topsoil
	6" - 30"	Clayey Sand: brown
	30" - 36"	Silty Sand: white
TP83-85	0" - 9"	Topsoil
	9" - 23"	Clayey Sand
	23" - 30"	Silty Sand: white
TP83-86	0" - 4"	Topsoil
	4" - 15"	Clayey Sand
	15" - 21"	Silty Sand: white
TP83-87	0" - 8".	Topsoil
	8" - 18"	Clayey Sand and Gravel
	18" - 24"	Silty Sand: white
TP83-88	0" - 6"	Topsoil
	6" - 18"	Silty Sand and Gravel
	18" - 24"	Silty Sand: white
TP83-89	0" - 6"	Topsoil
	6" - 12"	Silty Sand, some Gravel: brown
	12" - 30"	Silty Sand, some Gravel and Cobbles
TP83-90	0" - 8"	Topsoil
	8" - 16"	Clayey Sand
	16" - 24"	Silty Sand: white
TP83-91	0" - 4"	Topsoil
	4" - 19"	Clayey Sand
	19" - 23"	Silty Sand: white
TP83-92	0" - 6"	Topsoil
	6" - 20"	Clayey Sand
	20" - 26"	Silty Sand: white
TP83-93	0" - 3"	Topsoil
	3" - 22"	Clayey Sand
	22" - 24"	Silty Sand: white
TP83-94	0" - 6"	Topsoil
	6" - 11"	Clayey Sand
	11" - 16"	Silty Sand: white
TP83-95	0" - 6"	Topsoil
	6" - 19"	Clayey Sand
	19" - 24"	Silty Sand: white

TP83-96	0" - 3"	Topsoil
	3" - 11"	Clayey Sand
	11" - 15"	
		Silty Sand: white
TP83-97	0" - 6"	Topsoil
	6" - 21"	Clayey Sand and Gravel
	21" - 24"	Silty Sand and Gravel: white
		oney some and Graver. Writte
TP83-98	0" - 6"	Topsoil
	6" - 19"	Clayey Sand
	19" - 25"	Silty Sand: white
		Sirty Saild: White
TP83-99	0" - 6"	Topsoil
	6" - 12"	
	12" - 18"	Clayey Sand
	12" - 18"	Silty Sand: white
TP83-100	011 611	
11 03 100	0" - 6"	Topsoil
	6" - 15"	Clayey Sand
	15" - 21"	Silty Sand
TP83-101	0" - 6"	Toncell
	6" - 27"	Topsoil
	0 - 21	Clayey Sand
TP83-102	0" - 6"	Topsoil
	6" - 17"	Clayey Sand
	17" - 20"	Silty Sand: white
		Sitty Salia. Writte
TP83-103	0" - 6"	Topsoil
	6" - 19"	Clayey Sand
	19" - 24"	Silty Sand: white
		Sifty Sand: White
TP83-104	0" - 6"	Topsoil
	6" - 19"	Clayey Sand, some Gravel
	19" - 23"	Silty Sand: white
		only sand. Write
TP83-105	0" - 6"	Topsoil
	6" - 28"	Clayey Sand and Gravel
		oldycy Sand and Graver
TP83-106	0" - 6"	Topsoil
	6" - 12"	Clayey Sand
	12" - 15"	Silty Sand: white
TP83-107	0" - 5"	Topsoil
	5" - 14"	Clayey Sand
	14" - 17"	Silty Sand: white
		Sitty Salid: Willte

TP83-108	0" - 6"	Topsoil
	6" - 18"	Clayey Sand
	18" - 24"	Silty Sand: white
TP83-109	0" - 6"	Topsoil
	6" - 18"	Clayey Sand
	18" - 24" -	Silty Sand
TP83-110	0" - 6"	Topsoil
	6" - 12"	Clayey Sand
	12" - 18"	Silty Sand: white
TP83-111	0" - 6"	Topsoil
	6" - 28"	Clayey Sand and Gravel
	28" - 29"	Silty Sand: white
TP83-112	0" - 6"	Topsoil
	6" - 12"	Silty Sand: brown
	12" - 18"	Silty Sand: white
TP83-113	0" - 6"	Topsoil
	6" - 30"	Silty Sand: brown
	30" - 36"	Silty Sand, some Gravel
TP83-114	0" - 6"	Topsoil
	6" - 12"	Clayey Sand
	12" - 18"	Silty Sand: white
TP83-115	0" - 6"	Topsoil
	6" - 12"	Clayey Sand
	12" - 18"	Silty Sand and Gravel: white
TP83-116	0" - 6"	Topsoil
	6" - 12"	Silty Sand: brown
	12" - 18"	Silty Sand: white
TP83-117	0" - 6"	Topsoil
	6" - 12"	Silty Sand: brown
	12" - 24"	Clayey Sand and Gravel
	24" - 27"	Silty Sand and Gravel: white
TP83-118	0" - 6"	Topsoil
	6" - 12"	Clayey Sand
	12" - 18"	Silty Sand: white

TP83-119	0" - 6"	Topsoil
	6" - 12"	Silty Sand: brown
	12" - 18"	Silty Sand: white
TP83-120	0" - 6"	Topsoil ,
	6" - 28"	Clayey Sand and Gravel
TP83-121	0" - 6"	Topsoil
	6" - 12"	Clayey Sand
	12" - 18"	Silty Sand: white
TP83-122	0" - 6"	Topsoil
	6" - 18"	Clayey Sand
	18" - 24"	Silty Sand: white
TP83-123	0" - 6"	Topsoil
	6" - 36"	Clayey Sand
	36" - 48"	SIIty Sand: white
TP83-124	0" - 6"	Topsoil
	6" - 24"	Clayey Sand
	24" - 48"	Silty Sand: white
TP83-125	0" - 6"	Topsoil
	6" - 24"	Clayey Sand
	24" - 36"	Silty Sand: white
TP83-126	0" - 6"	Topsoil
	6" - 12"	Clayey Sand
	12" - 18"	Silty Sand and Gravel
TP83-127	0" - 6"	Topsoil
	6" - 54"	Clayey Sand, some Gravel
TP83-128	0" - 6"	Topsoil
	6" - 36"	Clayey Sand and Gravel
TP83-129	0" - 6"	Topsoil
	6" - 18"	Clayey Sand
	18" - 30"	Clayey Sand and Gravel
	30" - 36"	Silty Sand: white
TP83-130	0" - 4"	Topsoil
	4" - 16"	Clayey Sand, some Gravel
	16" - 24"	Silty Sand: white

TP83-131	0" - 6"	Topsoil
	6" - 48"	Clayey Sand, some Gravel
		3.2757 32.1127 33.113
TP83-132	0" - 6"	Topsoil
	6" - 30"	Clayey Snad, some Gravel
	30" - 36"	Silty Sand: white
		Sinty Sund: White
TP83-133	0" - 6"	Topsoil
	6" - 18"	Clayey Sand and Gravel
	18" - 24"	Silty Sand: white
		Silty Salid. Write
TP83-134	0" - 6"	Topsoil
	6" - 12"	Clayey Sand and Gravel
	12" - 18"	Silty Sand: white
	12	Sifty Saild. Willte
TP83-135	0" - 6"	Topsoil
	6" - 42"	Clayey Sand, some Gravel
	42" - 46"	Silty Sand: white
	72 70	Sifty Sand. Write
TP83-136	0" - 6"	Topsoil
11.03.130	6" - 18"	Clayey Sand, some Gravel
	18" - 24"	Silty Sand: white
	10 24	Silty Sand. White
TP83-137	0" - 6"	Topsoil
	6" - 72"	Clayey Sand, some Gravel
		Ciayey Sana, some Graver
TP83-138	0" - 6"	Topsoil
	6" - 12"	Cobbles
	12" - 15"	Silty Sand: white
		Sitty Sand: Write
TP83-139	0" - 6"	Topsoil
	6" - 36"	Clayey Sand, some Gravel
	36" - 40"	Clayey Sand and Gravel
		Grayey Sarra and Graver
TP83-140	0" - 12"	Topsoil
	12" - 36"	Silty Sand: brown
		ont, ound. brown
TP83-141	0" - 4"	Topsoil
	4" - 24"	Gravelly Sand, some Cobbles
		cravelly salita, some cossies
TP83-142	0" - 4"	Topsoil
	4" - 22"	Clayey Sand
	22" - 28"	Silty Sand and Gravel
TP83-143	0" - 6"	Topsoil
	6" - 18"	Clayey Sand, some Gravel
	18" - 24"	Silty Sand: white

TP83-144	0" - 6"	Topsoil
	6" - 72"	Silty, Clayey Sand
TP83-145	0" - 12"	Topsoil
	12" - 24"	Clayey Sand, some Gravel
	24" - 36"	Silty Sand and Gravel
TP83-146	0" - 6"	Topsoil
	6" - 18"	Clayey Sand, Some Gravel
	18" - 24"	Silty Sand and Gravel: white
TP83-147	0" - 4"	Topsoil
	4" - 36"	Silty Sand and Gravel: brown
TP83-148	0" - 4"	Topsoil
	4" - 16"	Clayey Sand and Gravel
	16" - 24"	Silty Sand and Gravel
TP83-149	0" - 9"	Topsoil
	9" - 21"	Clayey Sand and Gravel
TP83-150	0" - 6"	Topsoil
	6" - 18"	Clayey Sand, some Gravel
	18" - 24"	Silty Sand: white
TP83-151	0" - 9"	Topsoil
	9" - 18"	Clayey Sand and Gravel
TP83-152	0" - 9"	Topsoil
	9" - 15"	Silty Sand: white
TP83-153	0" - 9"	Topsoil
	9" - 30"	Clayey Sand and Gravel
TP83-154	0" - 9"	Topsoil
	9" - 30"	Clayey Sand and Gravel
TP83-155	0" - 9"	Topsoil
	9" - 12"	Clayey Sand and Gravel
	12" - 18"	Silty Sand: white
TP83-156	0" - 6"	Topsoil
	6" - 18"	Clayey Sand and Gravel
	18" - 21"	Silty Sand: white

TP83-157	0" - 6"	Topsoil
	6" - 9"	Clayey Sand and Gravel
	9" - 15"	Silty Sand: white
		Sitty Saild. Writte
TP83-158	0" - 6"	Topsoil
	6" - 9"	Clayey Sand and Gravel
	9" - 15"	Silty Sand: white
TP83-159	0" - 6"	Topsoil
	6" - 15"	Clayey Sand and Gravel, some Cobbles
TP83-160	0" - 6"	Topsoil
	6" - 12"	Silty Sand and Gravel
TP83-161	0" - 6"	Topsoil
	6" - 12"	Clayey Sand, some Gravel
	12" - 24"	Silty Sand and Gravel
		and state
TP83-162	0" - 12"	Topsoil
	12" - 24"	Clayey Sand, some Gravel
	24" - 30"	Silty Sand: white
		Sincy Suria. Write
TP83-163	0" - 9"	Topsoil
	9" - 21"	Clayey Sand, some Gravel
	21" - 24"	Silty Sand and Gravel
TP83-164	0" - 9"	Topsoil
	9" - 21"	Clayey Sand, some Gravel
	21" - 24"	Silty Sand and Gravel
TP83-165	0" - 6"	Topsoil
	6" - 12"	Clayey Sand and Gravel
	12" - 15"	Silty Sand: white
TP83-166	0" - 6"	Topsoil
	6" - 24"	Clayey Sand
	24" - 27"	Silty Sand and Gravel
TP83-167	0" - 9"	Topsoil
	9" - 15"	Silty Sand: light brown
	15" - 18"	Silty Sand and Gravel
TD02 160	011 611	
TP83-168	0" - 6"	Topsoil
	6" - 21"	Clayey Sand, some Gravel
	21" - 24"	Silty Sand and Gravel

TP83-169	0" - 9"	Topsoil
	9" - 21"	Clayey Sand
	21" - 24"	Silty Sand: white
		Sitty Saile: Wifte
TP83-170	0" - 9"	Topsoil
	9" - 15"	Clayey Sand, some Gravel
	15" - 2-1"	Clayey Sand and Gravel, some Cobbles
	21" - 24"	Silty Sand and Gravel
		Sitty Saild alld Graver
TP83-171	0" - 9"	Topsoil
	9" - 15"	Clayey Sand
	15" - 36"	Silty Sand
		Sirty Saird
TP83-172	0" - 36"	Gravelly Sand
		Graveny Sand
TP83-173	.0" - 6"	Topsoil
	6" - 30"	Gravelly Sand
	0 30	Oravelly Sand
TP83-174	0" - 4"	Topsoil
	4" - 48"	Clayey Sand
	48" - 60"	Clayey Sand and Gravel
	40 00	Clayey Sand and Gravei
TP83-175	0" - 6"	Topsoil
	6" - 12"	Clayey Sand
	12" - 24"	Clayey Sand and Gravel, some Cobbles
		Clayey Sand and Graver, some Copples
TP83-176	0" - 6"	Topsoil
	6" - 18"	Clayey Sand
	18" - 21"	Clayey Sand and Gravel
		oldycy Salid alid Gravel
TP83-177	0" - 6"	Topsoil
	6" - 18"	Clayey Sand
	18" - 21"	Clayey Sand and Gravel
		Ciayey Sand and Graver
TP83-178	0" - 9"	Topsoil
	9" - 21"	Clayey Sand
	21" - 24"	Silty Sand and Gravel
		Sitty Sand and Graver
TP83-179	0" - 9"	Topsoil
	9" - 21"	Clayey Sand
	21" - 24"	Silty Sand
TP83-180	0" - 9"	Topsoil
	9" - 15"	Silty Sand: white
		oncy band. Write
TP83-181	0" - 9"	Topsoil
	9" - 15"	Silty Sand: white
		one, outer wine

TP83-182	0" - 9" 9" - 21" 21" - 24"	Topsoil Clayey Sand, some Gravel Silty Sand and Gravel
TP83-183	0" - 6" 6" - 12" 12" - 24"	Topsoil Clayey Sand
TP83-184	0" - 9" 9" - 30"	Silty Sand and Gravel  Topsoil Silty Sand, some Gravel

ine Permit Nu perator <u>He</u> O	mber <u>MD2.1000</u> Cla <i>mini</i>	Mine Na ng Co FROM_	me <u>ESCA</u> Date <u>Janua</u>	lante Silvary 2, 1992
CONFIDE	NTIAL _BONE	CLOSURE TTRACKING SH	LARGE MAPS EETNEW A	_EXPANDABLE
Description			YEA	R-Record Number
	_Incoming	_Outgoing	Internal	Superceded
Re	clamation	in Plan		
NOI	Incoming	_Outgoing	Internal	Superceded
NOI	Incoming	Outgoing	Internal	Superceded
NOI	Incoming	Outgoing	Internal	Superceded
TENTO 1	/O X/ 11 D / A D D	A CEC 113	V 17 MADO	LADCEMAR
		AGESII 2		LARGE MAP